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THE MAGAZINE OF THE SOCIETY FOR TECHNICAL COMMUNICATION

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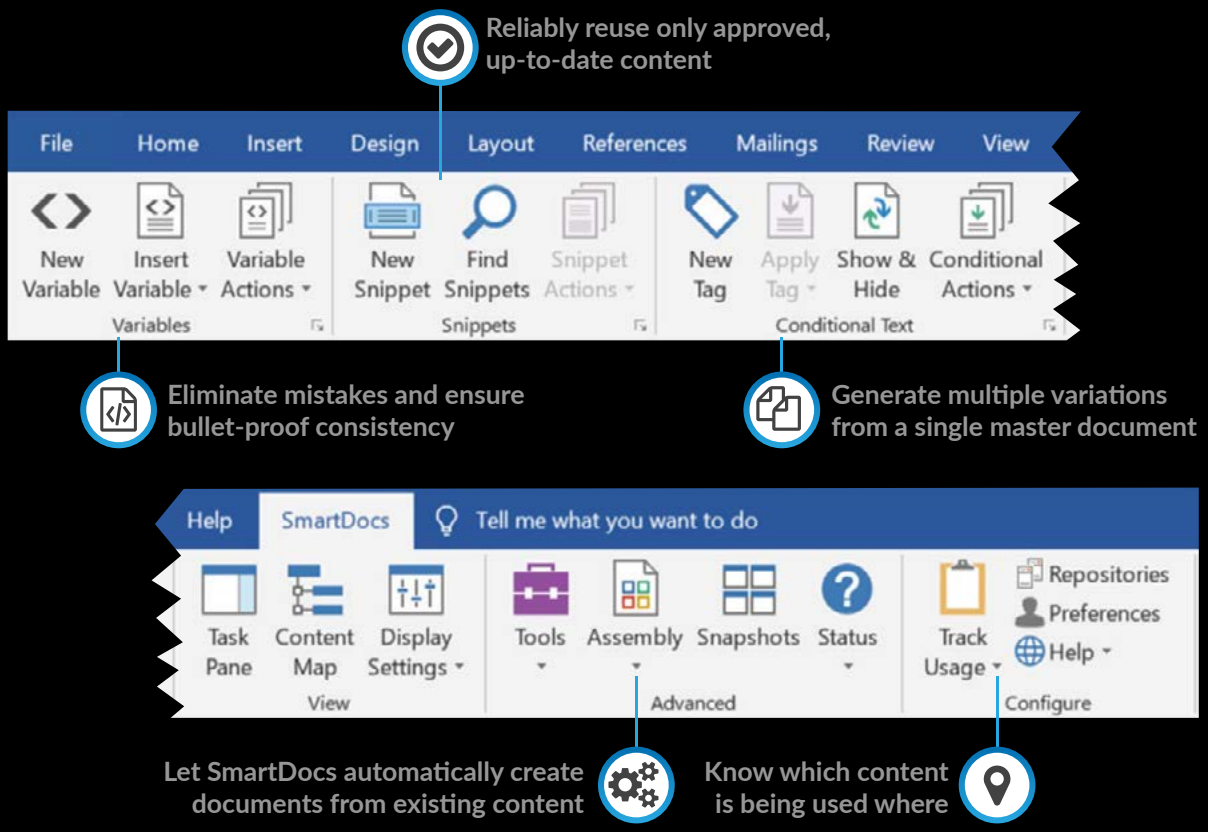


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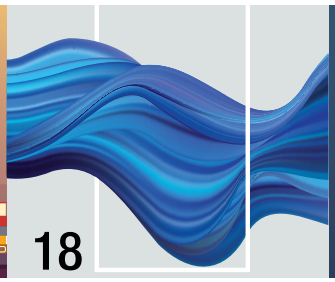

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**Intercom**, the magazine of the Society for Technical Communication, is published to provide practical examples and applications of technical communication that will promote its readers' professional development.

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**Chief Executive Officer** Elizabeth E. (Liz) Pohland
**Executive Editor** Andrea L. Ames
**Editor** Sarah Black

**CONTRIBUTING EDITORS**
Scott Abel, *Meet the Change Agents*
Thomas Barker, *The Academic Conversation*
Kit Brown-Hoekstra and Cindy Currie, *Ask a Tech Comm Manager*
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**SOCIETY FOR TECHNICAL COMMUNICATION**
3251 Old Lee Highway, Suite 406
Fairfax, VA 22030
+1(703) 522-4114 | +1(703) 522-2075 fax
*Send questions and correspondence to the editor at the above address. General information about STC:* stc@stc.org *or* www.stc.org.

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# A Note from the Editor

When Liz Herman proposed an issue on knowledge management (KM), I knew she was a great choice to guest edit that theme!

Many STC members know Liz for her contributions to the Society as a Board member and committee chair, her service on the *Intercom* Editorial Advisory Committee, and her leadership in the Eastern Iowa and Washington DC Baltimore chapters. You might also know her from a project management or technical communication course at the University of California, San Diego, Extension.

What makes Liz especially well-suited to guest-edit this issue, though, is her work in knowledge management. Not only is she building a KM practice at Senture, LLC, but she recently concluded a KM project with the United States Department of Agriculture. And KM is definitely a passionate pursuit for her! As she says in her guest editorial, it is her *love language!*

Thanks to Liz's expertise and KM connections, we have a super issue for you! I want to thank Liz and the feature authors—Dr. Maureen Hammer, Sara Feldman, John Campbell, Terence Pyle, and Liz, herself!—for the outstanding KM content in this issue.

If you are new to the topic of knowledge management, or you want to dive deep on a new dimension of KM, this issue has something for you!

As always, we have a great column lineup for you, as well.

- In *Content Technologies,* Cruce Saunders delivers a very theme-relevant dive into content as a service, intelligent content, content services organizations, and knowledge management with "Content-as-a-Service for Knowledge Management, Powered by Content Intelligence."
- Tom Barker introduces us to the new Academic SIG leader, Carol Luttrell, in "New Directions for the Academic SIG" for *The Academic Conversation*—congrats to Carol and the SIG!
- In *Editing Matters,* Michelle Corbin discusses SEO and its relationship to editing with "SEO for Editors."
- *Student Perspectives* guest columnist, Eric Korankye, discusses his experiences with US-centric pedagogies, the importance of diversity in learning, and some examples of contributions to learning from his own Ghanaian experience with "Imagining Just Futures by Designing US Technical Communication Pedagogies that Integrate Knowledge from Ghana, Africa."

Don't miss the latest-and-greatest in the Society Pages, and remember that editor, author, and columnist email addresses are provided so that you can engage with us! We *love* to hear from you—do reach out with questions, comments, or anything at all!

Until next time: To your wild success!

Andrea Ames

— Andrea L. Ames
*intercom-editor@stc.org*

# Guest Editorial

**BY DR. LIZ HERMAN** | *STC Associate Fellow*

KNOWLEDGE MANAGEMENT (KM) is my love language. I love understanding how people in organizations manage what they know. I love, as a technical communicator, making sense out of the complex information and data that endlessly swirls around us. If we've met, you likely know that I see technical communication everywhere and as a part of everything. And if KM is my love language, then technical communication is my . . . soul? It's absolutely the foundation and engine that has driven my entire career, enriched my life, and been the focus of my continuing education. Shout out to all my STC colleagues who have encouraged and supported me throughout the years! Which reminds me, I'm on the Nominating Committee, so if you're interested in running for the STC Board, please reach out!

But back to this issue. Where was I? Oh—my English-major, technical-communication, knowledge-management-lovin' soul. It's why I believe that technical communicators make great project managers, and it's why I believe that technical communicators also make the best knowledge managers. Whether you're starting to think about KM as a career path or you're fully engaged in a KM project and figuring out how to do more with less, this issue has something for you.

Starting us off, in "Knowledge Management in Practice," Dr. Maureen Hammer defines KM for us and shares tools and approaches to make KM initiatives successful. Specifically, she provides an overview of successful KM practices that any organization can adopt. You'll remember that I like to talk about the many hats we wear as technical communicators. Well, Maureen talks about the different hats you need to wear in KM: strategist, persuader, organizer, facilitator, and measurer. If that sounds like the skills you have—and I'm sure it does as a technical communicator—then you won't want to miss her article.

In the next article, "Supercharge Your Technical Content Value with Knowledge-Centered Service," written by Sara Feldman, you'll gain an understanding of yourself as a knowledge worker with a KM methodology to reference and deploy. Knowledge-Centered Service (KCS) focuses on knowledge as an organization's key asset. By systematically connecting technical content with customer interactions, KCS drives improvements in time to proficiency, customer self-service, and data-driven product improvements. Sara also touches on change management, which operates in parallel with any KM initiative, and her final section gives you some tangible dos and don'ts to consider while you move forward.

In the third article, John Campbell writes about his challenges, successes, and failures creating a knowledge base on the cheap. Technical communicators certainly understand how to do more with less, and John's case study provides great detail about how to build an open-source solution to transform a collection of Microsoft Word documents into a full-fledged KM repository linked to alerting, ticketing, and reporting systems. "Developing a Knowledge Base on the Cheap: A Case Study" is a hands-on example of KM in practice.

Finally, the article titled "Digital Services and Knowledge Management: A River Runs Through It" includes my thoughts on why KM is central to any digital services strategy. There are a great many lessons learned from the past few months that we can use to improve online services to customers, and KM—with its focus on people, process, technology, content, and culture—runs through all of them.

I trust that you'll enjoy reading these articles as much I did. Thank you, Maureen, Sara, and John, for sharing your knowledge. Knowledge sharing is such an important component of any KM initiative, so it's wonderful to see you all embodying that practice.

In the spirit of sharing even more knowledge, I've also included an article written by Terence Pyle, who in turn, shares his knowledge about "Guidelines for Creating Effective Software Design Documentation." His tips for keeping design documents accurate and up-to-date will surely resonate.

From my experience, KM is a continuous, iterative process. It doesn't simply end after the first round of knowledge is collected and shared, and it certainly doesn't simply stop once an enabling technology has been implemented. If you're participating in, or leading, a KM project, help people understand that it requires maintenance and ongoing attention and the people to manage it. In other words, it requires love!

Thanks for reading,

*Liz*

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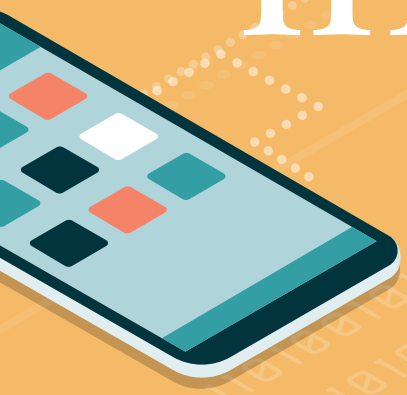
# Knowledge Management in Practice



By DR. MAUREEN HAMMER

TO UNDERSTAND KNOWLEDGE management (KM) in practice, we should define it. Before we define KM, however, we need to share a common understanding of *knowledge*. Knowledge is the technical, social, and political information that individuals have learned through formal and informal learning, including *explicit* knowledge, or information, and *tacit* knowledge, which is experience and expertise influenced by context.

Now, how do we define *knowledge management*? In general terms, it is the identification, collection, organization, dissemination, and use of critical knowledge within an organization. It's an attempt to identify what knowledge an organization and employees hold, who needs that knowledge, and how to provide that knowledge to the right people at the right time.

KM in practice varies depending on the goals and needs of individual organizations. The approach to creating an initiative, however, is standard, although the tools you use will depend on what you are trying to accomplish. Let's take the journey to establish KM in your organization by reviewing several common goals:

- Mitigate the loss of knowledge
- Make knowledge findable
- Improve performance
- Support innovation

## Goal: Mitigate the Loss of Knowledge

If you are anticipating a retirement wave, have a lot of new employees, are experiencing movement within the organization, or your employee tenure has shortened, then your goal might be to mitigate the potential loss of knowledge. We no longer have the organizations of the past, where people come to work just out of school or training and stay for their entire career. We no longer have apprenticeship programs where people are taught and knowledge is transferred. These aren't bad things; in fact, knowledge within the organization can be increased when employees come from different backgrounds and experience. The key is to create opportunities for people to share and leverage that knowledge.

### Conducting a Knowledge Audit

Regardless of your goal, it's critical to know what knowledge the organization, and the people within it, holds. Conducting a knowledge audit helps to identify the following:

- Where the knowledge is
- Who the experts are
- Whether you have adequate bench strength in a given knowledge area
- Whether that knowledge has been documented
- How knowledge does, or does not, transfer across the organization

When conducting a knowledge audit, make a record of where all the documented knowledge is located. The knowledge or information might be located in the following places:

- In common electronic repositories
- In individual hard drives
- In offices in written format
- Held by individuals

### Creating a Knowledge Matrix

Create a knowledge matrix that lists the critical knowledge areas in the first column. In the first row, list the possible repositories. In each cell, list the exact location of the knowledge, such as the name of the system, the specific office, or the individuals. If there are limited electronic repositories, list them individually in the first row, and mark an "X" in the cell to indicate that knowledge resides there.

The matrix is a living document that expands as new repositories are uncovered. To identify the repositories, conduct interviews with experts who can start you on the journey of discovery. You might discover multiple knowledge areas to explore; if so, prioritize them. The matrix serves as your map to uncover and gather the knowledge. Relocate critical knowledge to centralized repositories, if possible; if not, keep the location up to date to make that knowledge accessible when needed. Some knowledge might be outdated; in that case, you might still collect it to archive for future reference or to use as a source for new knowledge.

### Creating Directories of Expertise and Knowledge Books

Creating directories of expertise allows you to determine who can be tapped when an opportunity or challenge arises. For knowledge areas that are critical to your organization's core functions—especially those areas where you found only one or two levels of depth of expertise—consider creating a *knowledge book*. The knowledge book details processes, networks of expertise, the purpose and reasoning behind steps and decisions, and the information and data that support further decision making.

### Creating Communities of Practice

Create Communities of Practice (CoPs) to intentionally gather individuals together to share knowledge, document that knowledge, and create new knowledge. The CoP should be relatively small and made up of experts with long tenures in the organization, as well as employees with a shorter tenure who are new to their field or who bring experience from other organizations. The CoP can document a process or lessons learned, introduce others to their networks, and mentor. Creating CoPs hastens the transfer of knowledge from individuals to the organization.

## Goal: Make Knowledge Findable

If you have information housed in multiple repositories, different geographic areas, or a variety of formats, your goal might be to make knowledge and information findable. As with mitigating knowledge loss, start with a knowledge audit. During the audit, document the various systems, the information they store, and whether they are connected or stand alone. Our organizations have so many disparate systems—how do we bring them together and make information findable?

### Creating Document Centers

Create corporate document centers that house authoritative and critical information to reassure employees that they have the latest versions of documents and that the information has been reviewed and approved.

### Creating a Common Taxonomy

If you have a library, work with the experts there to create a common taxonomy that can be used to categorize documents and individuals who are experts in a specific area so that others can tap into that knowledge. Data managers can help create links across systems by identifying appropriate fields that house similar information.

We are all so busy that our default style of work is to solve an issue and move on (single-loop learning).

## Goal: Improve Performance

Perhaps your goal is to improve performance by decreasing the time needed to complete tasks or integrate functions. Accomplishing this requires technical and organizational knowledge.

### Reengineering Your Business Processes

*Business process reengineering* requires an in-depth look at a process, documenting the as-is state, identifying steps that are no longer needed or should be adapted, and creating a new process. Attach the critical knowledge supporting each step, including the names of individuals, corporate documents, lessons learned, how-to videos for completing the step, training materials, or case studies—whatever will help flesh out the knowledge required to be successful. If you've created CoPs, leverage them to support increased communication and collaboration between functions. Enlist them to perform the business process review and identify what knowledge is needed—where it is and whether it needs to be documented.

### Reviewing Actions—Before, During, and After

*Before-, during-, and after-action reviews* are helpful to document knowledge going forward. We are all so busy that our default style of work is to solve an issue and move on (single-loop learning). If we do not take time to reflect, however, we keep solving the same issue over and over. We must be double-loop learners, and the action reviews help with that. They provide time to review and identify the following:

- What went well
- What didn't
- Whether we have a successful new approach that should be shared and incorporated into our processes
- Where our processes are broken and have been subject to regular work-arounds

These reviews should cover not just the *what* of decisions, but also the *why* behind the decisions to inform others when they perform their before-action reviews, increasing shared organizational knowledge.

## Goal: Support Innovation

Finally, your goal might be to support innovation by encouraging creative thinking, ideas, and learning. Perhaps you want to build new functions or deploy new research or ideas. If so, consider the following:

- CoPs can support this goal through collaboration; enlist them to validate submitted ideas or to work with submitters to implement ideas.
- After-action reviews can also be used to support innovation; create case studies and include them in learning events that might spark innovation.
- Coaching and mentoring are key tools with this goal to encourage employees and teach them how to stay focused on the desired end goal and address challenges more creatively and innovatively.

## Knowledge Manager Skills

There are five KM skills that will help you be successful:

- Strategy
- Persuasion
- Organization
- Facilitation
- Measurement

### Strategy

First, you must be a strategist and be able to define the role of KM in reaching organizational goals and objectives. Ask yourself the following questions:

- Does my organization have an intent to manage knowledge?
- Where will I start?
- Where are the opportunities?
- Where are the champions?
- What will provide the most compelling story?
- Does my organization have an intent to transfer, retain, and create knowledge?
- How will I measure?

### Persuasion

You must be persuasive and make a business case that makes sense to decision makers to invest in KM techniques and approaches. Note that these decision makers might have different needs, so it's important to know what keeps them up at night.

### Organization

You need to be organized and set up the infrastructure, partnerships, technology, and tools that will make you successful.

### Facilitation

Facilitation skills enable you to support participants in the KM initiative. You need not be an expert in the target domain of knowledge, but you must be an active listener and able to guide participants.

### Measurement

Finally, you must measure your success in terms that speak to the decision makers and participants. This includes ensuring there are quantitative and qualitative metrics that demonstrate the value of KM.

How will you measure? Consider these measurements:

- Cost avoidance
- Cost savings
- Time savings
- Efficiencies gained
- Qualitative feedback

Most important is to tell the story and ensure that the organization sees the benefit of the initiatives.

## Other Critical Success Factors

For KM to be successful, both individuals and the organization need to support the effort.

### Support from Individuals

Leadership should embrace its responsibility to share knowledge and expertise, and management should agree and see the benefit of making time for employees to participate.

In addition, gaining grassroots support from those who will be participants means making the case of what's in it for them and how it will help them. Most people do not realize that the personal knowledge they have is extensive and needed by others; they don't know what they know until they are asked.

### Support in the Organization's Culture

The organizational culture must support knowledge sharing and embrace teamwork and collaboration over individual accomplishment and recognition. Recognition should be for teams and knowledge sharing, not rewarding those who protect their knowledge and hesitate to share.

Learning organizations—those that embrace double-loop learning—are the most successful with KM. Everyone is so busy that workers in a typical organization solve problems without ever sharing what they learned, which sentences the organization with needing to reinvent the wheel over and over. Double-loop learning acknowledges the value of pausing and examining what happened, as well as pooling all of those innovative approaches to create a new organizational approach, using before-, during-, and after-action reviews.

What can you expect? There will be resistance, typically due to a perception that there is no time to stop and identify the knowledge that currently exists in the organization. People want proof, and pilot projects demonstrating the value of KM initiatives are beneficial. Seek to answer the following questions with your pilot-project results:

- How are you going to replicate this on a larger scale?
- What is the cost-benefit?
- What lessons did you learn that will revise or impact your approach in the future?

## The Value of KM

As organizations face new challenges and opportunities, it's critical to transfer knowledge held by individuals to the organization so that it can be incorporated into processes and tools used by others. This helps the organization understand its core functions and allows all members of the organization to be proactive in meeting future needs rather than reactive. It also ensures that the organization becomes an employer of choice, where people can take part in exciting opportunities, learn, grow, and share what they know.

DR. MAUREEN HAMMER (mhammer6@comcast.net) *has been with Battelle Memorial Institute since 2016. Prior to that, she served as the Knowledge Management Officer at Virginia DOT (VDOT) for over 12 years. Dr. Hammer has over 25 years of experience in information and knowledge management. Under her leadership, the VDOT Knowledge Management Program was a finalist in the 2008 Harvard Innovations in Government Award and a finalist in the 2007 KM Reality Award for KM World. Dr. Hammer has significant experience in knowledge transfer tools and techniques, the development and maintenance of knowledge portals and business intelligence delivery systems, outreach, business process improvement, training, information and library services, taxonomy creation, content and document management, data management, and knowledge architecture.*

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# Supercharge Your Technical Content Value with Knowledge-Centered Service

By SARA FELDMAN

YOUR COMPANY KNOWLEDGE isn't yours. Let that sink in for a minute: your company knowledge *does not belong to you.* It doesn't belong to you any more than your company-issued laptop belongs to you.

You are, however, responsible for making the best use of your knowledge, just as you are responsible to make use of any company asset under your care. Unlike more tangible assets, it can be tricky to gauge the use and shared value of something as nebulous as knowledge.

Fortunately, we can derive measurable knowledge benefits with the help of Knowledge-Centered Service

(KCS®), a knowledge management (KM) methodology focused on knowledge as an organization's key asset. KCS is based on nearly 30 years of iterations by a collaborative community and is owned by members of the Consortium for Service Innovation.

Imagine gaining efficacy from content that you already have as well as increasing efficiency with uncaptured knowledge that you already know. Even better, the improvements apply to both internal users and your customers.

While the details are quite robust and meant to scale across organizations with hundreds or thousands of employees, we can understand the foundation of KCS fairly quickly. Let's review the basics and principles of KCS and then explore how KCS provides guidance to boost the value of your technical content.

## KCS Basics

KCS guides service and support teams to operationalize KM through collaborative efforts to achieve the following:

- Integrate the reuse, improvement, and creation of knowledge into the problem-solving process
- Evolve content based on demand and use
- Develop a knowledge base of collective experience to date
- Reward learning, collaboration, sharing, and improving

Anyone who participates in KCS activities is a Knowledge Worker. The most common KCS programs focus on Customer Service or Support Agents, but anyone involved in interactions where information is exchanged is a Knowledge Worker.

Based on a double-loop process, the KCS methodology outlines practices to efficiently *solve issues* in the first loop and *evolve knowledge* in the second loop. Practicing KCS creates continuous improvement through the double loop, and KCS becomes the way people solve problems and create knowledge as a by-product of problem solving.

### Solve Loop

Knowledge Workers capture demand-driven knowledge during their problem-solving workflow. The Solve Loop activities occur through a practice often summarized by the acronym UFFA, which stands for Use it, Flag it, Fix it, Add it. The "it" is knowledge, of course, which exists in the form of knowledge base articles, embedded help, documentation, and other technical content.

Consider an example of a good, old-fashioned phone call from a customer who needs help. A Support Agent who takes the call does their best to help the customer. A Knowledge Worker who takes the call does their best to help the customer in a way that *also* helps their peers *and* any potential future customers who encounter a similar issue.

To follow the UFFA model, the Knowledge Worker does the following:

1. Searches the knowledge base, or any relevant resources, to *Use* the most current, captured knowledge
2. Notices if there is a content gap for the customer's issue and *Flags* existing, relevant content for revision
3. Takes the time, if they are able, to immediately *Fix* existing, relevant content for the customer's issue
4. Captures new knowledge and the customer's context to *Add* knowledge to a shared repository

Instead of recording information into case notes or just sharing directly with the customer, Knowledge Workers capture and improve shared knowledge as part of their issue resolution workflow. When many Knowledge Workers participate, the captured knowledge continually evolves in the context of customer issues. Solve Loop techniques ensure that knowledge is captured in such a way that it can be efficiently reused by others.

The Knowledge Worker perspective applies to many different roles beyond Support. Any Service interaction—internal or external—where knowledge is exchanged becomes applicable for KCS. Customer Success, Human Resources, Information Technology, and Field Services are other common examples. With KCS, one-to-one interactions become opportunities for one-to-many knowledge exchange.

### Evolve Loop

Practicing KCS can be a dramatic shift within an organization, and effective change management is essential. Evolve Loop activities address higher-level process changes and guide reflective analysis of Solve Loop activities to ensure that KCS leads to positive outcomes. An important aspect of driving toward positive outcomes is to ensure KCS principles are upheld at all times.

The KCS principles are as follows:

- *Abundance*: Share more, learn more.
- *Create Value*: Work tasks; think big picture.
- *Demand Driven*: Knowledge is a by-product of interaction.
- *Trust*: Engage, empower, motivate.

Techniques within the Evolve Loop focus on content health, process integration, performance assessment, leadership, and communication. Evolve Loop techniques ensure that we effectively measure content use and reinforce KCS principles by connecting KCS activity to wider organizational benefits.

## KCS Benefits

People are excited about KCS because knowledge is a valuable, yet underused, asset within organizations. By integrating knowledge capture and continuous improvement into existing processes, we make relevant knowledge reusable and self-correcting.

KM strives to make best use of knowledge to achieve organizational objectives. As a methodology based on KM, KCS enables three types of organizational benefits:

- *Operational efficiency*: More robust captured knowledge in the context of demand increases capacity and reduces time to proficiency for new Knowledge Workers.
- *Self-service success*: Published knowledge becomes accessible by customers, within their context, for the highest audience reach and lowest effort.
- *Organizational learning*: Reflective analysis of knowledge interactions leads to product, process, and service improvements.

## Applying KCS to Technical Content

Two high-level possibilities exist for how to explore KCS:

- If teams in your organization are already practicing KCS, seek to align with their processes and techniques.
- If teams in your organization are not already practicing KCS, identify how you can more directly incorporate KCS principles.

### Incorporating KCS Principles in Technical Communication

Are you unintentionally hindering an abundance mindset or missing opportunities to achieve big-picture value? Incorporate KCS techniques to gain insight for content optimization and to improve business outcomes. The most important outcomes are typically tied to revenue (such as acquisition, retention, upsells, cross-sells), and these outcomes are a reflection of helping customers experience value from our products and services.

Demand-driven knowledge activity helps prioritize efforts around customer needs. Measure internal and external interactions with captured knowledge to systematically connect technical content with customer demand.

Relevant knowledge is a key to meeting your customers' needs. How can you author and publish your technical content in a way that more closely aligns to customer interactions? Consider relevance for both human-assisted and unassisted self-service interactions. Is your content designed to help your customers experience the highest possible value? Their perspective includes context and effort that likely goes beyond the scope of your product or service. Could you help them even more if you incorporated their wider context?

Consider all knowledge interactions across functions in your organization, both internal and external. Are your insights and measurement capabilities siloed? What opportunities do you have to cross-functionally measure knowledge interactions to truly prioritize the most important areas for improvement? KCS looks different in every organization. What do your Solve Loop and Evolve Loop look like?

For your Solve Loop, how can you incorporate collective knowledge capture into existing processes? Knowledge can include relevant product information and metadata. For example, you could work toward more blended knowledge delivery so that users can find and interact with diverse knowledge sources wherever they're looking. Truly blended knowledge means users can find any content from where they are and that all your content has a shared data schema for effective analysis.

For your Evolve Loop, how can you reinforce collaborative effort to drive toward the same outcomes across your organization? To create the most value for your customer, you may be required to revisit old assumptions, compromise on established methods, or get creative. For example, perhaps particular technical content is relevant to include a lead or upsell call to action (CTA). Or perhaps a popular troubleshooting article highlights an opportunity for automated issue resolution.

Think about how technical content powers your business outcomes and how every content interaction gives insight into what your users are trying to do. Then use those insights to prevent your customer from expending effort to interact with that content in the first place.

## Your Next Move

Change is hard but necessary, especially in the subscription economy, where customers can move on in an instant.

Do not:

- *Settle for vanity metrics (analytics that do not connect to meaningful outcomes).* Instead, use metrics to find connections to value or to identify high-friction interactions that you can mitigate.
- *Make excuses not to change.* Instead, identify how you should compromise so that your customers don't have to. Consumer behavior has changed, and so should your methods.
- *Take a tools-first approach.* Instead, obsess over your customer context to figure out what customers need, and ideate solutions from there. Vendors will try to convince you that you have a problem that fits their solution.

Do:

- *Get the right people together.* Effective KM is cross-functional and constantly evolving. Form a knowledge council and work toward shared goals.
- *Assume there are assumptions.* Take the time to define terms and call out how disparate goals could be hindering collective wins.
- *Think big picture.* Ideally, products are perfect, and there's no need for supplemental technical content at all! While that's highly unlikely, we should do everything we can to move products toward that ideal.

A best next step is to define your internal and external users and what each needs to be successful within their context. Even if you think you know, revisit the idea with cross-functional representation.

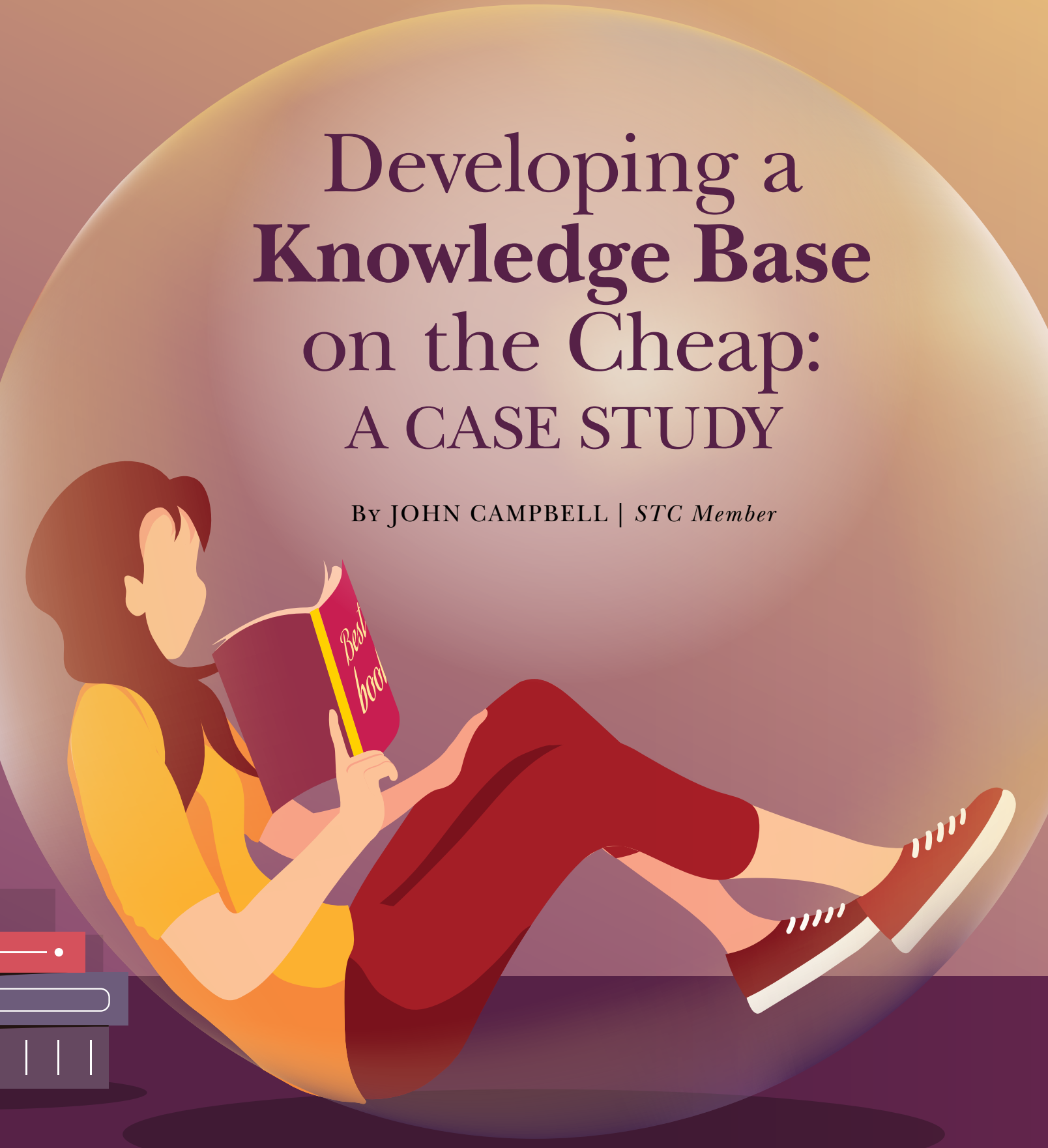
Then, enable knowledge insights to successively do the next best step to reduce effort and increase value for your customers.

*KCS is a registered trademark of the Consortium for Service Innovation.*

SARA FELDMAN (feld.sara@gmail.com) *is experienced with customer-centric functions in the software industry. She specializes in customer self-service, Knowledge-Centered Service (KCS), customer success enablement, and cross-functional technical content strategy.*

# Developing a **Knowledge Base** on the Cheap: A CASE STUDY

By JOHN CAMPBELL | *STC Member*



IN 2011, I was hired by Viasat, a satellite-based broadband internet provider, as the sole technical writer to develop a new system for handling network operations center (NOC) troubleshooting documentation. The NOC managers were concerned that their current system was untenable with an upcoming satellite and network launch (meaning a huge increase in documentation). Viasat's existing documentation setup consisted of a couple hundred Word documents on a shared server. Version control was little more than a manually maintained table at the end of each Word document.

The NOC wanted to upgrade from this relatively chaotic system to a wiki-type site that would allow their techs to add and edit procedures directly in a web browser. They wanted it to be searchable, and they wanted the ability to define user groups with group-specific permissions. They also wanted approval workflows so that a group of editors could modify documents and a different group of approvers could review edits before they went live to ensure the accuracy of the troubleshooting processes. The managers wanted automated version control and the ability to roll back to previous versions. They also wanted to be able to customize the system and add in-house features, like automations created by internal developers. Additionally, the company wanted to have reporting on the new system so that they could learn things like which procedures were the most commonly used or how many procedures specific users edited over the course of a month.

As for the budget for this effort, Viasat hoped to leverage existing systems or develop a new system that wouldn't cost much. A turnkey solution would be costly, since rotating crews in the NOC would likely require securing a license for each tech. I was encouraged to do some research on potential solutions—the cheaper, the better. I was given this task on day one (after I finished the requisite corporate trainings), so I went home and had a little panic attack . . . then started researching.

## Open-Source Solution

After looking into several open-source options, I provided the managers with an overview of my findings and recommended a content management system (CMS) called *concrete5*. The cost was negligible, as the application required only space on a server with Apache (web server software), PHP (a scripting language), and MySQL (an open-source SQL database). Plus, there was good documentation and a well-populated user community available to answer questions and troubleshoot issues. I demonstrated an installation of concrete5 on my laptop to show the managers how the CMS met most of their requirements and received approval. It was time to build this thing for real.

The initial concrete5 installation was performed on an existing server that handled our monitoring system, requiring that I work with the monitoring team to get the CMS configured properly. I then began to develop the knowledge base using the concrete5 user interface, creating page templates, user groups, approval workflows, and so on.

However, Viasat wanted some custom features that weren't part of the concrete5 core application, and this required some PHP research and support from the concrete5 community. For example, the managers wanted automated emails to be sent when a page was edited or published (a functionality that didn't exist in that early version of concrete5). I found a discussion in the concrete5 user forums that was related to this idea, and several users not only provided samples of code I could use but the logic behind them so I could understand how to customize the code from the forum to enable our site to trigger emails when a page was added, updated, or deleted.

Once the site framework and features were in place, I created training documentation to instruct users how to add and edit pages in the new system, and I ran some classroom training sessions to walk people through the process. I then converted all the existing troubleshooting procedures into pages in the knowledge base, and we were up and running. Although the site's search functionality wasn't great, and I still had to generate reports manually for the managers, it was a pretty significant improvement over the previous setup.

## Growth

A couple of years later, in 2014, Viasat's Technical Operations organization (which oversaw the NOC) began working toward certifications that required a more robust documentation process. While the knowledge base began as a troubleshooting repository

for network operations (i.e., maintenance of the satellite and network), as a result of the certification work, we now needed to review our overall documentation situation and consider expanding the scope. Most of our documentation was siloed, meaning that crucial information was difficult to find or wasn't making it to the right users.

We again had a list of requirements, and I was tasked with reviewing our options. This time, we also looked at the corporate wiki and a knowledge base associated with our ticketing system. Again, we went with concrete5. This CMS gave us more flexibility and oversight than the wiki, and it was (obviously) significantly cheaper than paying extra for the knowledge base element of our ticketing system. However, we needed to scale up in a big way.

Scaling up from the existing site to a new knowledge base required more resources. To aid in the day-to-day documentation tasks as well as the development of the new site, we hired a second technical writer. Finally, we had a documentation team! We then worked with the IT department to secure two virtual servers (development and production) so we could manage our own application instead of relying on a separate team, and we were given the responsibility of installing the latest version of concrete5. The version we had used in the previous site base was several versions (and a couple of years) out of date; we had not upgraded due to the difficulty of engaging the monitoring team for making changes on their server.

Our increased autonomy and responsibility required gaining new skills to deliver the new site. For example, we needed to become proficient working from the command line in Linux to manage the installation of concrete5 and to configure Apache and PHP to ensure the site would run smoothly. We needed to become more familiar with the architecture of the concrete5 application so that we could customize it to meet our users' needs. We had to immerse ourselves in HTML5 and CSS so that we could give a fresh, clean look to the new site. Finally, we needed to study the MySQL database structure to understand the data relationships in concrete5 and how the system operated. I knew next to nothing about these areas when I started at Viasat, so I had to learn quickly, spending a lot of time visiting Codecademy, Stack Overflow, and W3Schools. With these new skills in place, we were able to deliver a new site with more features to a wider user community.

Over the past few years, the site has continued to grow as more teams outside of Technical Operations have learned about our ability to create custom pages and environments, our regular management of the content, and our intermittent delivery of new features. Today, the site has become an overall knowledge repository for multiple teams throughout the company. Where the initial site served about 25 users, we now have over 200 regular users and contributors and over a thousand registered accounts. We've gone from sharing a server with the monitoring team to our own dedicated virtual machines, and we're looking into moving to the cloud in the future. We now have thousands of pages of process and reference documentation and about 20 custom page templates for different teams.

## Data Analytics and Reporting

While our knowledge base was evolving, however, our reporting process had stagnated. Although concrete5 has some native reports in the dashboard—primarily error logs and the like—these weren't useful for our stakeholders. As a result, we continued reporting on user edits, approvals, and page changes to the NOC management, compiling data into an Excel spreadsheet through a manual process that took several hours a week. As the knowledge base grew and more teams relied on it for their documentation needs, however, teams began to ask for more information about the site, such as most visited pages, how many users we had, and the number of edits by page type. We needed some data analysis capability that wouldn't involve us staring at a spreadsheet for hours each week.

Enter Splunk, a data analysis platform that Viasat was already using to monitor devices in our network. We piggybacked on the platform and connected it to our MySQL database and production server to pull Apache access logs, which we had to learn how to read. The research we had done on the relationships in our database guided us in writing the queries to create the reports we wanted—we knew which columns and tables we needed to pull information from. These connections allowed us to use Splunk to mine data about how our site was being used in ways that weren't available to us through the concrete5 user interface.

With our new Splunk knowledge, we developed many automated reports, dashboards, and alerts. A few examples include the following:

- A report on pages edited that we'd been compiling manually for years
- A dashboard displaying the number of pages added per month over the past year
- Automated emailed reminders that a page hadn't been updated in a year and needed to be reviewed for accuracy
- Most visited pages, most common search terms, and so on

Automating the report that we'd once manually complied saved us at least a couple of hours each week. If we were manually creating all of the reports we currently generate with Splunk, the effort would represent hundreds of hours of work per year, so this is a really powerful and useful tool for us.

## Where We Are Now

The knowledge base has become one of the company's integral systems, well beyond the original scope of the

initial troubleshooting document repository. We continue to add new features from the concrete5 community to enhance the site. For example, we contracted with one of the members of the community (whom we met at a PHP conference in Portland, Oregon, in September 2018) to develop a customized search feature that has greatly improved the quality of the search results on the site. We also purchased an LDAP authentication package that allows users to log in with their corporate credentials instead of remembering yet another username and password. All in all, the total cost of this system is less than $1,500, and over the course of developing and growing this system, we learned how to write PHP code, create MySQL queries, and manage a Linux server—skills that make us more flexible in our work and better able to contribute in other areas of the company.

Looking back at our experience developing our knowledge base, there have been many benefits—and a few challenges—over the years. Obviously, the biggest benefit is the cost. Being able to create a customized knowledge base for next to nothing has been great for our users and managers. We gained many new skills that have been useful in other situations at Viasat; these skills definitely weren't part of our original job descriptions, but they increase our value. And the autonomy and control we have over the management of our site is wonderful. We can jump in with a fix if we encounter an issue, and we can roll out a new feature without having to wait on some software company's release schedule.

There are some challenges, however. Quite simply, this isn't a turnkey solution, and it's not as ubiquitous as Microsoft Word or SharePoint, so some teams have been slow (or have outright refused) to adopt the site as their documentation solution because it's "not what they're used to." It's also a bit more work to integrate it with other systems, and we've also had to manage expectations about what the knowledge base is intended to do. It doesn't allow you to edit spreadsheets in the browser like SharePoint, for example, and it doesn't have the same robust search ability that Google search does, so we try to be straightforward with our users about what the site can do and what it can't. Finally, because we developed the site, some users have been hesitant to take ownership of the documentation; instead of adding or editing pages in the site, they view that as our role, which defeats some of the purpose of a site where everyone can contribute. Still, the benefits have far outweighed the challenges.

## Do It Yourself

Note that my case study involves concrete5 and Splunk, but there are many open-source content management systems and data analysis platforms out there. Feel free to explore!

To build a knowledge base and reporting solution like the one I've described above, follow these steps:

1. Set up the environment. This is the machine on which your site will run (laptop, desktop, virtual machine or server). The machine should have a 2+ GHz CPU, 12 GB of memory, and a 64-bit OS.
2. Ensure that the machine has up-to-date versions of PHP, MySQL, and Apache. There are free packages that will install all three applications on a machine. If you're on a MacBook, MacOS has Apache and PHP built in, so you'll need only to install MySQL separately.
3. Create a MySQL database for use with concrete5.
4. Download and install concrete5.
5. Download and install Splunk.
6. Install the DB Connect add-on for Splunk, which also requires installation of the Java Development Kit (JDK) and the appropriate Java Database Connection (or JDBC) driver.
7. Set up a connection to your MySQL database from the DB Connect interface in Splunk.

While I benefited from Viasat's enterprise license, Splunk does have a free option. Splunk Free provides 500 MB of daily indexing and a single user to generate reports, dashboards, and so on. This would be useful for smaller organizations in which you might be the primary user generating reports on your knowledge base for management. Splunk also has relatively inexpensive enterprise licensing options that are dependent on data index volumes. In our concrete5/Splunk model, Splunk connects to our database and doesn't index data at all, so the volumes are very low—likely within the 1 GB per day minimum. This type of license would cost $150 per month, billed annually, for a cost of $1,800 per year. This option allows you to provide metrics dashboards to multiple users who visit your Splunk site, as well as generate automatic alerts for triggered scenarios, such as sending automatic emails to users when their pages reach an out-of-date threshold.

JOHN CAMPBELL (john@campbell.fyi) *is a senior technical writer for Viasat and currently serves as the president of the Rocky Mountain Chapter of STC. He has 16 years of experience in technical writing, including writing software user manuals, editing medical college courseware, and managing a corporate knowledge base. As a new technical writer, John's main interest was in document design and styling. Now, however, he spends time writing code, developing database queries, managing workflows, and authoring the occasional procedure. In his spare time, John likes hanging out with his family, playing disc golf, going to heavy metal shows, and checking out the craft beer scene in Denver.*

See John's extensive list of links to resources for building your own knowledge base in the web version of this article at *www.stc.org/intercom*.

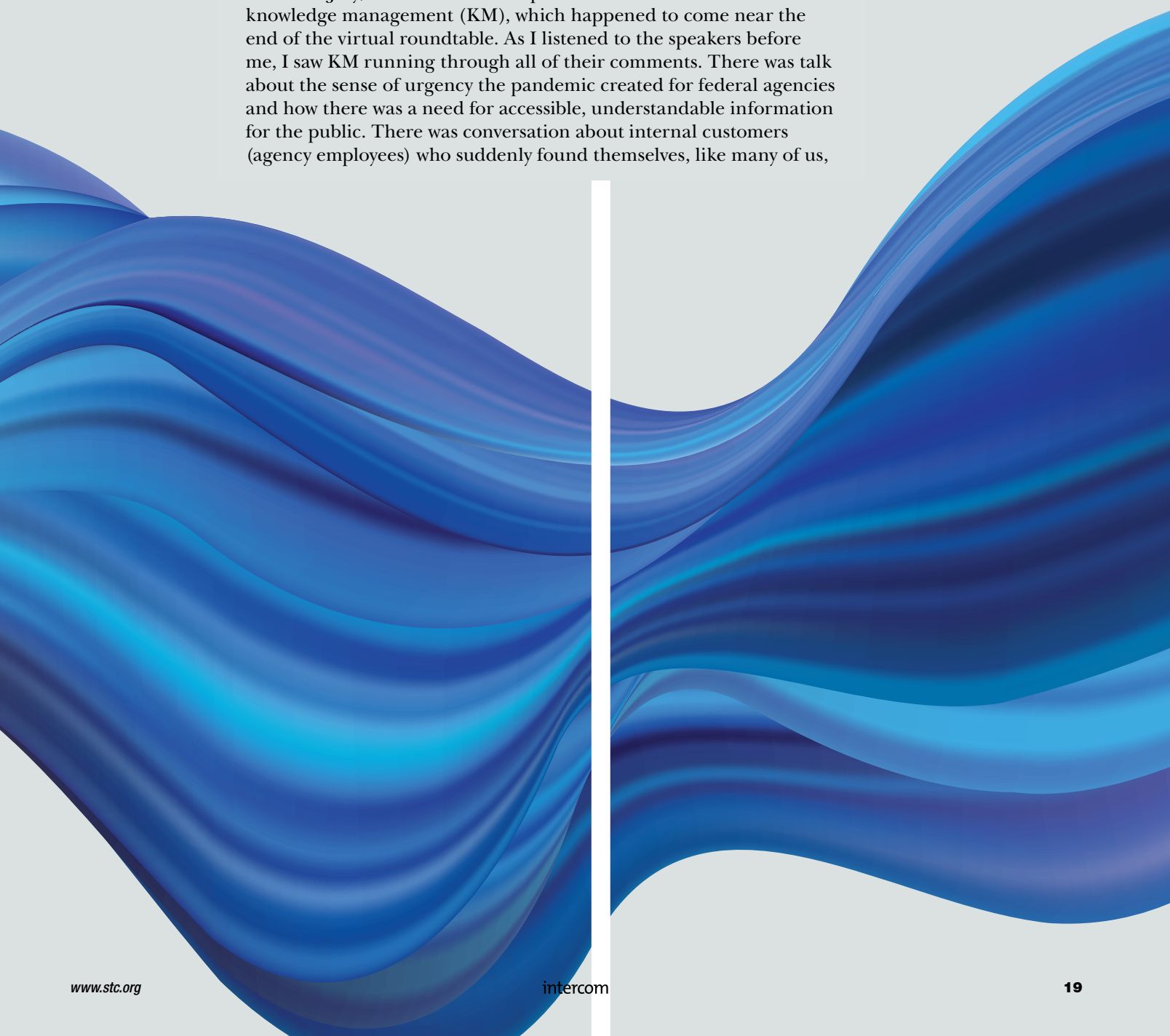
# Digital Services and Knowledge Management:

# A RIVER RUNS THROUGH IT

By DR. LIZ HERMAN | *STC Associate Fellow*

IF YOU READ the March/April 2020 issue of *Intercom*—more specifically, the article I wrote titled "Customer Experience and Content: The Field of Dreams"—you might have picked up on the movie theme that I used as an analogy. You won't be surprised, then, to see another movie analogy appear in this article as well. I'm not sure if the current pandemic has television stations replaying a lot of older movies, if I'm just racking up more screen time while staying home, or if I'm attempting to use that extra screen time as a sensemaking mechanism for the chaos of the world around me, but the movie *A River Runs Through It* came to mind while I was participating in, and listening to, a government roundtable about leveraging digital (think: online) services to assist customers.

In late July, I was scheduled to provide some remarks about knowledge management (KM), which happened to come near the end of the virtual roundtable. As I listened to the speakers before me, I saw KM running through all of their comments. There was talk about the sense of urgency the pandemic created for federal agencies and how there was a need for accessible, understandable information for the public. There was conversation about internal customers (agency employees) who suddenly found themselves, like many of us,



working from home, and how they had to find new and different ways to collaborate with each other. There was agreement that technology, metrics, and analytics can be useful to illuminate where information gaps exist. User experiences, journey mapping, and human-centered design were mentioned. KM is the river that runs through all of this. KM is the unifying piece of the puzzle when it comes to a digital service strategy. I'll elaborate, but first let me talk about the movie, which was recently on television.

*A River Runs Through It* is a movie based on the semiautobiographical novella of the same name by Norman Maclean. It stars Brad Pitt and is directed by Robert Redford, if that rouses anyone to watch the movie. Tom Skerritt, Craig Sheffer, and Brenda Blethyn are terrifically cast as well. It is also narrated by Robert Redford. Readers, his voice is like butter. It's his narration, coupled with the gorgeous Montana scenery, that is the star of this show—sorry, Brad. I won't spoil the movie for any future viewer other than to say that the storyline is about the Missoula River and how it connects with the land and how it connects people. Having grown up boating and paddling on the Mississippi River in Iowa, I know firsthand how the river runs through the story of my childhood. Sappy? Maybe, but watching the movie a few days before participating in the roundtable, I couldn't help but think about KM flowing like a river through digital service touchpoints.

## Touchless Services

The pandemic prompted many of us to embrace touchless experiences that we might not have accepted before. Online learning, telehealth appointments, mobile deposits, and ordering groceries for delivery are some examples. New programs introduced by the government rendered digital services absolutely necessary as citizens tried to find out about testing locations, stimulus checks, and small business loans, among other things.

While contact centers across the country—including Senture, LLC, the company I work for—quickly transitioned their customer service representatives (CSRs) to work at home while hiring hundreds more to meet the demands of these new programs, phone lines were still overwhelmed in the early stages of the remote-work situation, leaving people to access online resources to get questions answered.

There are lessons that we can learn from this and subsequently apply for continuous customer service improvement. Leveraging KM is central to this discussion.

## Seize the Moment

KM is all about having the right information, understandable to you, and available to you at the right time. The best KM practices ensure that there is a continuous-improvement feedback loop between the users, stakeholders, subject matter experts, knowledge and content managers, technical communicators, and even the systems in use. For example, if a CSR uses a knowledge base to answer a customer's question, "seizing the moment" means enabling the CSR to give immediate feedback about that answer, directly from the system they're using, to the content team. Seizing the moment ensures that answers stay accurate and relevant in the knowledge base and truly assist the inquiring customer. If a CSR doesn't have a channel back to the KM team, opportunities to improve the knowledge base can be lost. It's the same with customers: if customers aren't given an opportunity to rate answers in the knowledge base or provide their level of satisfaction with an answer, the feedback loop breaks, making it more difficult to improve answers or correct outright errors.

In many cases, and certainly during the pandemic, customers are not interacting with CSRs, making it more critical that knowledge portals, agency websites, and AI-enabled technology such as chatbots deliver the right information. In those digital self-service channels, customers still need a way to interact with, and provide feedback on, information. *Seizing the moment* means pausing *now* to collect lessons about how those digital services failed us or left us wanting during the pandemic, while those lessons are top of mind, and incorporating them into strategies and solutions going forward.

## A Sense of Urgency

Now that I've hopefully imbued a sense of urgency around capturing lessons learned before we all block out 2020 as an *annus horribilis*, exercise caution when disseminating information without considering the user experience. The pandemic has most likely tested the best KM governance and content management plans. In efforts to share knowledge, the knowledge hasn't always maintained its user-centeredness—in other

words, it wasn't always understood by the customer. As one participant remarked during the roundtable, the sense of urgency eclipsed the human-centered design process. Her lesson learned was that information needs to be reviewed through the user's eyes before it sees the light of day. Without that lens, more work is created as information is backtracked through review processes and refined to minimize customer confusion and provide support. I'm not necessarily advocating a "less is more" approach when it comes to sharing knowledge, because information should ideally flow like water from a fire hose in times of crisis. Users and their experience with said knowledge, however, must always be considered. Shoring up our ability to keep users in mind when sharing knowledge in urgent situations will strengthen future responses.

## Collaboration

Whose heart wasn't warmed by people sharing teaching tips, sewing and music lessons, or video conference how-tos? Knowledge sharing is suddenly in fashion. We need to continue that momentum. When we're on the other side of this and living in "the new normal," let's remember the feeling of unifying for a greater good and remember how sharing knowledge made a positive impact. Let that be one of the first lessons learned to come from this: hiding knowledge serves no one.

The most successful organizations embraced available collaboration tools to continue doing work *and* to maintain a sense of engagement among their employees. Who has been to a virtual happy hour with their organization within the last six months? In this, too, KM plays a role. Organizations that had ready content or were able to quickly develop content around working from home, system setup, and video conference instructions seemed to fare better in terms of pandemic response reaction. This is anecdotal, but academics and researchers take note of the rich canvas before us in terms of studying what worked well and who (which organizations) truly thrived during the pandemic with KM. When you move your whole organization offsite in a few days, the knowledge that employees have accessible to them in the remote environment becomes paramount. A robust KM program eases those transitions. Just as organizations want customers to have access to information, employees must have access as well, from wherever they are and often without the assistance of another person. Self-service for employees is also necessary when considering digital services.

## Technology Enablement

Technology *enables* KM; it, in and of itself, is not KM. When conducting a case study years ago on an organization's adoption of KM, I quickly learned that the technology didn't matter as much as the employees, the organizational culture surrounding those employees, and how change was managed. I know that continues to be true today, which is why I discuss technology as an enabler of KM.

During the pandemic, technology-enabled KM allowed knowledge and content teams to see how customers accessed information from their agencies and organizations. That's important, because it helps us understand, going forward, which self-service channels become channels of choice in times of crisis: Is it the web portal? Answers provided through an Interactive Voice Response? AI-enabled web chat? But it also forces us to consider questions about still-used channels, like correspondence. What happens when there's no one in the building to answer the mail? How do we accommodate those users? Is there a technology-enabled solution for that?

As discussed in the roundtable, agencies saw success in sharing knowledge and engaging employees when they used technology enablement in multiple ways, such as the following:

- The public-facing portal
- The employee-facing intranet
- The learning management system offering training courses
- Document management systems fostering synchronous and asynchronous collaboration
- The customer relationship management tool used to analyze customers

If the flow of knowledge was impeded during the course of the pandemic, identifying how technology supported or undermined those processes is worth uncovering and fixing, if necessary.

## Merging KM and Digital Services

In the last few lines of the movie, narrator Robert Redford says, "Eventually, all things merge into one, and a river runs through it." *Merge* is such a great word choice in that sentence written by Norman Maclean, because it means "to combine into a whole." Any digital services strategy cannot be whole without KM embedded across all the touchpoints. KM runs through it, and the opportunity is before us as knowledge managers to improve our practice using lessons learned from the pandemic.

DR. LIZ HERMAN (liz@lizherman.com) *is an STC Associate Fellow working at Senture, LLC, as its Director of Knowledge Management. She is currently on the STC Nominating Committee and writes the occasional book review for STC's journal Technical Communication. She grew up in Dubuque, Iowa, bordered by the mighty Mississippi River.*

# Guidelines for Creating Effective Software Design Documentation

By TERENCE PYLE

SOFTWARE DESIGN DOCUMENTATION plays a significant role in a software development environment and can be broadly defined to include any written or illustrated communication that describes how software works, what it does, and how to use it. In this article, I focus on software design documentation for software developers, sometimes called *internal documentation*. Common examples of software design documentation include requirements specifications, architectural documents, and detailed design documents.

These documents are read by individuals involved in the production of software, including managers, project leaders, and developers. Effective design documentation supports software development activities, keeps software quality high, and enables projects to be more easily transferred from one group to another.

Companies developing software either employ their own technical writers or outsource the creation of the documentation. This depends on the complexity of the software being developed and its demands on the documentation. Complex products with long-term development, which require detailed design documentation, benefit from having technical writers employed full-time. This way, the documentation can be created more quickly and precisely with the collaboration of subject matter experts. When subject matter experts do not write the documentation themselves, it's because they are too submerged in their field of expertise.

They might not see the subject matter from a broader perspective and thus may not write the information in the best way to suit their audience.

To write effective software design documentation, technical writers must understand why software developers seek information in their day-to-day tasks. In this article, I will first look at findings from studies that provide insight on what design information is most useful to them in their development tasks. Software developers need architectural understanding of the system

software, including functional components and how those components interact, as well as detailed design information.

I will then present findings from studies that have investigated software documentation problems, identifying issues related to what information is included in design documents and how the information is written and organized. Finally, I'll suggest some guidelines for creating successful design documentation that's easier for software developers to read, understand, and use.

## Software Development Methodology

In software engineering, you often hear the phase "software development methodology." A software development methodology is a framework used to structure, plan, and control the process of developing system software.

The two most well-known methodologies are as follows:

- *Waterfall*, which might be more properly called the "traditional" approach
- *Agile*, a specific type of rapid application development and more recently developed than Waterfall

The principle of the traditional methodologies is that the development process is sequential and divided into phases. Only after one phase is finished can the work on the next phase begin. These methodologies suppose that if a project is analyzed and well planned at the beginning, it will be better implemented. One of the best-known traditional development methodologies is the Waterfall process. Figure 1 illustrates the sequential scheme of Waterfall.

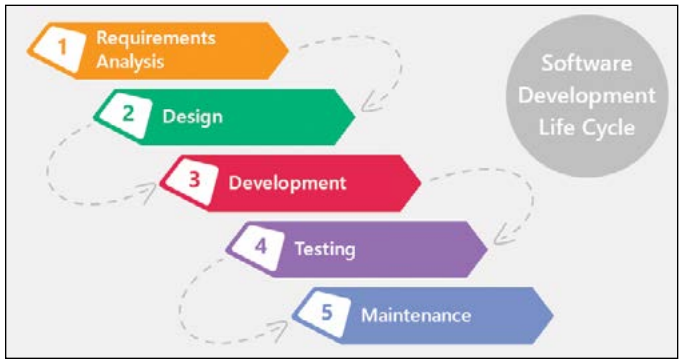



*Figure 1. Software development life cycle for the Waterfall model. (Source: Yana Sarycheva, XB Software)*

Waterfall methodology is suitable mainly for projects with these criteria:

- Requirements are clearly defined and unlikely to change during the development cycle.
- New requirements are unlikely to arise.
- Resources include enough time and people to complete each phase of the cycle.

In a traditional Waterfall approach to software development, documentation is created mainly at the beginning and end of the project. At the beginning, requirements specifications documents describe the project to be developed, including its features, attributes, and behavior. Architecture and design documents define visual and construction principles to be used in the product.

Agile is an iterative, team-based approach to development. This approach emphasizes the rapid delivery of an application in complete functional components. As Figure 2 shows, agile methodology is characterized by *continuous* planning, development, testing, and integration, underpinned by collaboration within a self-organizing, cross-functional team. The team iterates quickly and flexibly to deliver customer value on demand.

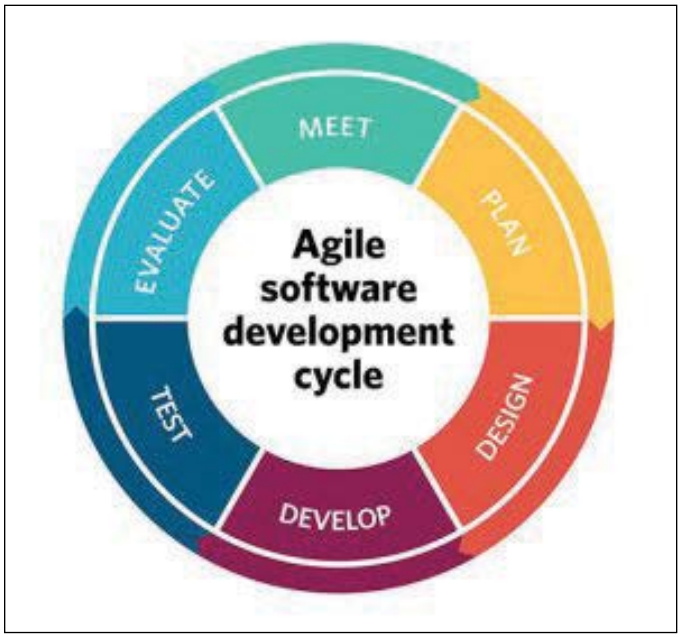



*Figure 2. Agile software development cycle. (Source: project-management.com)*

The opposite of creating documentation at the beginning and end of the project, agile promotes creating documentation *throughout* the project. If you're releasing functionality for each iteration, or every few iterations, comprehensive documents help users cope with the quick changes. Even if you don't release frequently, it still pays to have the writer keep up with development so you don't have to wait weeks at the end of development for your writer to document the product from scratch.

## The Technical Writer's Role on the Software Development Team

In agile development, documentation is included in the work done during each iteration. Therefore, agile methods advise that technical writers become members of the team and work physically in the same office or geographic location with the team. Such practice

encourages communication between the developers, QA engineers, and technical writers. It also enables the technical writers to participate in meetings and thus be more involved in the creation of the product, which can be beneficial for all roles and the product itself. The technical writers advocate for the system's users and can provide valuable feedback on the developed functionality while gaining technically accurate knowledge about the functionality directly from the other members of the agile team.

In software development, technical writers experiment with the documented software and interview the developers and testers about the software's functionality. Especially important are technical writers' soft skills, which are fundamental for keeping good relationships with subject matter experts, gaining information easily, working in teams, planning, and organizing working time effectively.

## Software Developers' Need for Information

Comprehending computer programs is a core software engineering activity. Software comprehension is required when a programmer maintains, reuses, migrates, reengineers, or enhances software systems. A large percentage of the software developer's maintenance activities is spent studying the software to understand it and to determine how planned modifications might be implemented.

Software maintenance is a predominant activity in software development. Software development is a dynamic activity during which constant changes need to be incorporated into existing products, necessary to keep software systems up-to-date and useful. A major problem affecting software maintenance is the lack of up-to-date documentation.

Studies that have analyzed software developers' day-to-day information needs have found the following: software developers have design questions—for example, developers need to know the intent behind legacy software architecture and current implementation. Design documentation communicates between members of the development team. When other developers are not available to answer questions, the design document provides big-picture information about the software system.

In a 2003 study, participants were asked what information developers needed to best support their development tasks. Responses indicated that the following aspects were most important:

- An overall understanding of the complete system
- Detailed information about components in their scope, together with interfaces, and in relationship to other components

Developers refer to the software documentation for the following tasks:

- Learning and working with a new software system
- Testing a software system
- Solving problems when other developers are unavailable to answer questions
- Looking for big-picture information about a software system
- Maintaining a software system
- Answering questions about a system for management or customers
- Looking for in-depth information about a software system
- Working with an established software system

## Problems Affecting Software Design Documentation

Studies investigating software documentation problems have identified issues related to the information contained in design documents and how it's written and organized, according to work by Emad Aghajani and colleagues. Here are some suggestions for ensuring that your design documents are accurate, complete, and up-to-date:

- Write only information that you understand, and then verify it
- Keep up with technical changes
- Strive to maintain consistency across all information about a subject
- Use tools that automate accuracy checks, and check the accuracy of references to related information

Documentation is incomplete if it does not contain the information about the system that the developers need to perform their tasks. Guidelines for making sure documentation is complete include the following:

- Cover all topics that support the developer's tasks—and only those topics
- Cover each topic in just as much detail as the developers need
- Repeat information only when developers will benefit from it

A document is outdated when it does not reflect what's implemented in the software code. Being up-to-date differs from correctness and completeness in that the

A major problem affecting software maintenance is the lack of up-to-date documentation.

information was likely correct and complete before a change was introduced.

Documentation issues related to how the content is written and organized include the following:

- Usability, or the degree to which readers can use the documentation to achieve their objectives effectively, including issues related to findability, organization, poor or inconsistent formatting, and accessibility
- Maintainability, or how easy it is to apply changes to the document's content or make corrections to it
- Readability, or the extent to which documentation is easy to read, including issues related to clarity and whether the information is overly abstract or technical
- Usefulness, or its practical use to readers—for example, whether software developers can successfully achieve their goals using the document

## Adding Value to Design Documentation

Studies of how software developers use documentation suggest that, to achieve greater documentation relevance, we must find ways to express the most useful information in less space and make the documentation easier to update (see, for example, Sergio Cozzetti's 2005 SIGDOC paper). Results from such studies indicate that software engineers create and use simple yet effective documentation and ignore complex and time-consuming documentation. Software design documentation must be up-to-date and consistent to better serve the developers' needs for information.

Using a *documentation standard* enables developing information with a consistent accepted reference for the format and content. This results in documents with a consistent appearance, structure, and quality and makes documents easier to read, understand, and use. (For information about ISO software documentation standards, check out Annette Reilly's *tcworld* article.)

## Conclusion

Technical writers are a vital part of the software development team and have just as much to do with product creation as developers, QA engineers, and designers. In fact, we need to be in constant communication with other departments to do our jobs efficiently. If we're involved in the planning, we can identify where additional documentation might be needed. To create proper documentation, we must coordinate with the development and testing teams.

When colocated with the software development team, we can add value to the software design documentation with an understanding of what design information is useful to developers. When we identify software design documentation problems and issues related to how the information is written and organized, we can create documentation that is useful to our readers.

TERENCE PYLE (pyleterence@gmail.com) *is a senior technical writer at Think Surgical, where he collaborates with a group of software engineers to write and edit software requirements and design specifications. He has worked in the field of technical communication for more than 30 years, providing technical writing and editing services to manufacturers and system integrators of electronic systems. He earned his MS in technical communication from Colorado State University. In his spare time, he enjoys researching his family history and meeting relatives at family reunions. He is a native Californian who has also lived in Colorado, Utah, and Wisconsin.*

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# *Technical Communication* Moves Up the Ranks

*TECHNICAL COMMUNICATION,* THE official journal of STC, is once again in the top 100 journals on Ingenta Connect, the world's largest resource for scholarly journals. In September 2020, *Technical Communication* ranked #48 out of 11,000 journals on the platform. This is up significantly over the journal's already-impressive ranking over the summer, when it was ranked #84 in Ingenta's library.

Users of Ingenta's platform include academic institutions, as well as individual subscribers. Access to the journal is restricted to subscribers, though non-subscribers can pay per article for access.

STC thanks Sam Dragga, PhD, Editor-in-Chief of *Technical Communication,* for his guidance and diligent work over so many years.

Dr. Miriam F. Williams will take on the position of Editor-in-Chief for the journal beginning in January 2021.

# Have You Renewed?

RENEWAL SEASON IS upon us! All STC memberships run on a calendar basis and expire on 31 December each year. All members must renew their memberships prior to 31 December to remain active in STC.

## Renew Online

As you renew, you will see a new page to update your demographic information. You may have encountered this page when you first signed up with STC, but it's now available with your renewal, as well. We encourage you to take a moment to review and make any updates to your information to help us get to know our membership a little better.

And for the first time, retired members can now renew their membership online! To qualify as a retired member, you must be a current member of STC with 10 years of membership, be 65 years of age or older, and work, on average, 20 hours per week or less. If you have questions about qualification, please reach out to us at membership@stc.org.

## NEW for Corporations

The Corporate Value Program (CVP) membership enables organizations to purchase a package of individual memberships for an entire tech comm team, at an overall discounted rate. We are now pleased to offer TWO levels of CVP membership: Professional & Academic and Gold. The new Gold level includes all Professional & Academic membership benefits plus free registration for all live webinars; an additional 20% discount off member rate for online courses; free memberships to one networking chapter and any virtual networking Special Interest Groups (SIGs) about a specific area of interest; a free subscription to STC's Roundtable, and more! Visit www.stc.org/membership/corporate-value-program/ for more information about this exciting new category.

Get answers to your most frequently asked questions about membership at **www.stc.org/membership-faqs**, or contact **membership@stc.org**.

# STC Student Scholarship Application Window Now Open

IN A YEAR where every little bit helps, the STC Scholarship Committee is pleased to continue the scholarship fund and plans to award a scholarship in 2021. STC will award one or more scholarships of $500 with associated student memberships to graduate, undergraduate, and certificate students studying communication of information about technical subjects.

Applications are being accepted now through 31 December, and the scholarship will be awarded in February 2021. Students who will attend classes in the 2021-2022 school year are eligible to apply. Scholarship payments will be sent directly to the school. Scholarship winners will also be awarded a student membership in STC (or an additional year's membership for a current member). STC student members are eligible to volunteer at the 2021 Technical Communication Summit & Expo in Atlanta, Georgia, and receive a free conference registration as well.

For information about scholarship criteria and awards, visit **www.stc.org/scholarship/** or contact **scholarship@stc.org.**

# Contribute to STC's *Notebook*

STC'S *NOTEBOOK* BLOG serves the important role of keeping the STC community updated on Society news and events, as well as sharing industry news and insight from STC members.

STC invites you to contribute to the blog with your own content. If you have something to share with the technical communication community, send your submission to publications@stc.org for consideration.

# Looking Ahead: 2021 Summit

TECHNICAL COMMUNICATION SUMMIT CONFERENCE & EXPO

## 6-9 June 2021 | Atlanta, Georgia

THE 2021 SUMMIT is preparing to provide a unique digital and in-person experience for attendees. While the in-person event is still planned to take place 6-9 June 2021 in Atlanta, Georgia, an online component ensures safe and seamless access for all.

The Summit is made up of two major parts:

**The Education.** Organized in tracks, these sessions offer a variety of formats and tracks.

**The Expo Hall.** Featuring numerous companies prepared to unveil and demonstrate new and exciting products, services, and technology to the world of technical communication.

In addition to these elements, the Summit also includes a Welcome Reception, Keynotes, and an Honors Event to celebrate the achievements of STC members and announce the Community of the Year award.

Attendance at the Summit provides 8 CEUs toward CPTC currency. CEUs apply only to those who are certified and cannot be counted retroactively.

Stay updated at **summit.stc.org.**

# Upcoming Webinars

## Learning Experience Design (LXD): A Day in The Life

19 November 2020
11:30 AM EST (GMT-5)

**Instructor:** Linda Daniels

Creating amazing learning experiences that drive engagement and behavior change with measurement that matters is a tremendous, yet very rewarding undertaking. Before we can sketch out our first idea, we need to align a diverse group of stakeholders, as well as identify business and learning strategies with data driven insights to ensure achievement of goals based on needs analysis, organizational culture and structure, personas, change tolerance, trends, and incentives, not to mention the "adoptability" of modern learning. As information architects, we are problem solvers who focus on the overall opportunity to map out what is needed before we can design a plan on how to get there.

In this webinar we'll talk about:

- How to get started identifying all the players involved with an initiative
- The critical need for good performance consulting
- Managing difficult conversations
- How to build credibility and trust with brand new teams

We will also review some of the steps, including Learner Journey Mapping, Experience Design, and Wireframing & Prototyping, as well as how having the right people in the room is critical to ensure success.

This is an opportunity to learn how user experience design and writing for training, instructional design, and technical writing come together.

Register at **www.stc.org/event/ldx-111920.**

## Podcasting for Fun and/or Profit

1 December 2020
1:00 PM EDT (GMT-5)

**Instructor:** Ed Marsh

Are you considering podcasting as an addition to your content offering, as a side project, or just curious about its impact? Join Ed Marsh for this session on the basics of podcasting, the benefits, and the building blocks of creating a successful podcast that can lead to other opportunities. No prior experience is required.

Register at **www.stc.org/event/podcasting-fun-and-profit.**

## Introduction to Accessibility in Tech Comm

8 December 2020
12 Noon EST (GMT-5)

**Instructor:** Char James-Tanny

According to the World Health Organization (WHO), close to 37.5% of the global population has at least one disability. That's more than 2 billion people! This includes our customers, our users, our co-workers, our managers, our peers, our friends, our families, and more.

During this webinar, Char James-Tanny will talk about things that we can do to make our documentation better for people with disabilities, such as improving color contrast ratios, using styles to create more accessible PDFs, adding captions to videos, and more.

Register at **www.stc.org/event/intro-to-accessiblity.**

## From Technical Writer to CEO: What is your Content Mindset? Sponsored by 36Software

8 December 2020
1:00 PM EST

**Instructor:** Lisa Pietrangeli

How do your choices as a technical writer really impact your company? Chances are that the metrics your company cares about—revenue, profitability, customer retention, etc.—are not the same metrics that your job performance is measured by.

The question is, if your company recognizes that there are deficiencies or goals not being met, how do they weigh in the impact of the content you create? Is there a Content Mindset? If so, what is it?

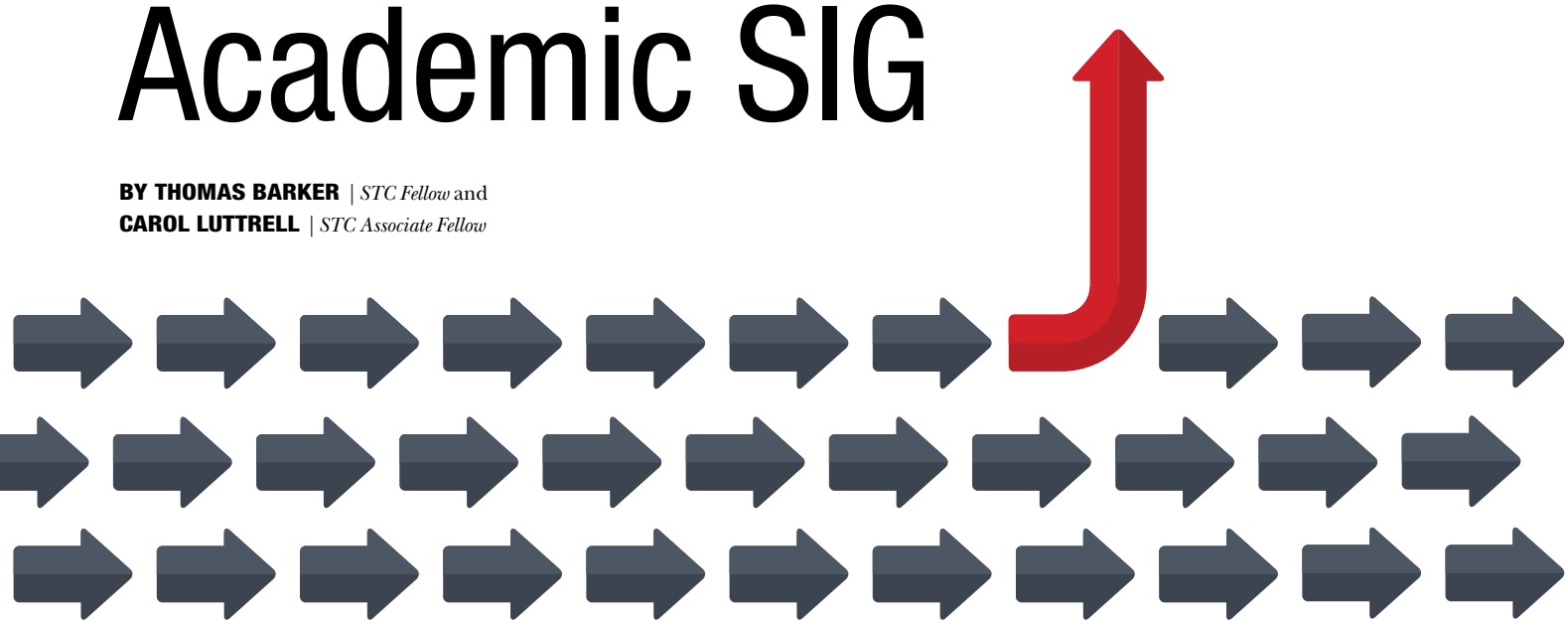
In this discussion, we will explore some of the important ways that the content you create significantly impacts your company's priorities and how your writing methods—content reuse and management (CCMS), specifically—can vastly improve how your company prioritizes you and what you do. Using SmartDocs as an example, we will illustrate some of the tangible benefits that a CCMS solution can bring to both your team and to your company's bottom line.

**BONUS!** Attend this webinar and you'll be entered automatically in the prize drawing for complimentary STC membership. One winner will be drawn from the attendee list of the webinar. You must attend the webinar to be entered to win. Membership level prize is for one (1) Professional & Academic membership ($225 value) for either membership renewal or new membership.

Register at **www.stc.org/event/from-tech-writer-to-ceo.**

# New Directions for the Academic SIG

**BY THOMAS BARKER** | *STC Fellow* and
**CAROL LUTTRELL** | *STC Associate Fellow*



THE PATH OF SIG management never runs smooth, but always upward and always renewed. Seeing a need for effective leadership and possessing a wealth of knowledge of STC, technical communication, and industry publication processes and values, Carol Luttrell was a perfect choice to take over the manager's role. In terms of industry credibility, Carol brings a world of knowledge from her work with Dupont, Independence Blue Cross, Motorola, and others over a career spanning four decades. A dedicated SIG member and STC Associate Fellow, Carol knows the workings of SIGs (having managed the International SIG for years), as well as training, marketing communication, and community work.

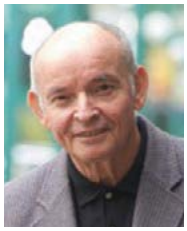
For the Academic SIG, the now Professor Luttrell—who teaches technical communication at the University of Delaware—takes on the work with a clear vision for moving the Academic SIG into the future. I had the pleasure of a long conversation with my new academic colleague in July, and this article will be dedicated to that vision.

In our discussion, Carol and I got to know each other a little better. I, of course, remembered her from her role as manager of the International SIG, and spending time with her in a Zoom meeting was a chance for me to relive and revive many great memories of STC from that era and to look at some of the challenges facing academic members today. Specifically, we had the chance to talk about important issues like the changing academic workplace, the evolving nature of SIG communication to address those changes, and, very importantly, the changes in instructional design facing so many Academic SIG members.

## In the Workplace

The employment situation for academics today, as Carol takes the helm, is not that of the tweed-clad, pipe smoking, privileged, male-dominated environment of the past. The job path might not be directly from associate to full, but a convoluted path that offers a variety of roles, as adjuncts and sessional faculty enter the field in greater numbers.

TIAA, a major retirement insurance provider in higher education in the U.S. reports that "about 70% of faculty in U.S. institutions hold full- or part-time nontenure-track positions." Almost half (44%) have more than one source of income. In some U.S. and Canadian colleges, up to 80% of "professors"



This column focuses on a broad range of practical academic issues from teaching and training to professional concerns, research, and technologies of interest to teachers, students, and researchers. Please send comments and suggestions to column editor Thomas Barker at *ttbarker@ualberta.ca.*

work contract to contract, often hired after the term begins, requiring them to construct syllabi on the fly. As members of the gig economy, these academics often face inadequate support and are evaluated by inappropriate criteria. As a result, issues such as job satisfaction, diversity, equity, and inclusion are now playing a more influential role in hiring and retaining.

When Carol began her career at the University of Delaware, the academic workforce was becoming more flexible and more strategic, but also facing issues of evaluation, contract inequities, lack of support (which we will return to later), high turnover, and a culture of silence that's unwilling to acknowledge, for various reasons, the shift to a less vetted—and in some ways—less capable academic workforce.

These realities of the academic workforce indicate that the potential member of the Academic SIG is an individual with different life experiences and different priorities than the academics of, say, 10 years ago. For one thing, current academics are not bound by publishing requirements of an earlier day, but nevertheless are equally driven to contribute to high-level intellectual conversations. They might be more comfortable with and capable of moving between the academic world and industry settings, but still see value in STC programs and messaging that supports the realities of their actual job.

In many ways, academia is not the same game as before. I asked Carol about the challenges that she saw technical writing instructors face at the University of Delaware. In that workplace, many of the instructors found they possessed the necessary teaching skills, especially in writing, but were not as strong in industry experience. On the other hand, Carol was quite capable of providing real-life examples, templates, and practical writing advice. Instructors with less industry experience found themselves able to help students do better in school writing but not so much on-the-job writing, relying on the textbook to convey much of the practical guidance in workplace technical communication that students craved.

## SIG Communication

In the past, much community communication within STC was rooted in mailing lists and asynchronous messaging. Today, however, discussion boards are giving way to productivity-oriented platforms like Slack, Asana, Google, and Trello. Many professionals use ResearchGate and LinkedIn regularly.

Academics are pressured more and more to use social media platforms for professional communication. Pearson Education, a huge textbook company, did a survey of academics in 2011 and concluded that "faculty are big users of and believers in social media." Such usage brings, the Pearson report says, issues of privacy (only 30% seemed comfortable using social media platforms in teaching) and integrity (only 20% trusted student submissions via social media). However, for collaborative learning and content delivery, most academics found social media sites "offer value" in teaching.

For many, social media offers new opportunities not just for teaching, but for disseminating research findings, mobilizing knowledge, and curating or incubating new research ideas. At my institution, the emphasis is on community engagement. As such, many professors regularly integrate Twitter and other platforms into their scholarly conversations. One writer on a ResearchGate forum made this observation:

> I recognize the value of professional dialogue among academics, yet are we perpetuating the "ivory tower" problems by restricting access in places like this [ResearchGate]? Would this be a good place to enhance our research by interacting with the users of our research so that they might critique our work or suggest areas that they see as relevant for further study?

This was in 2016, and a lot has changed since then, opening up social media platforms for academic communication with all its varied audiences. The implications of these communication realities are not lost on Carol. She related to me the desire to accommodate the use of appropriate media—even the possibility of a SIG-sponsored survey of social media usage and effectiveness factors—to achieve the objective of facilitating and getting things done for this valuable STC constituency.

## Instructional Delivery

Carol and I discussed some of the challenges facing the academic community of today, and as one might expect, the discussion focused on instructional delivery models. For many of us in the profession, the watchword for the spring and summer sessions is "emergency remote teaching" (ERT). The challenge is that, in this situation, student learning—and student perceptions that they are learning—is diminished.

Educause.com defines "emergency remote teaching" as a catch-all phrase to describe the varieties of COVID-enforced, socially distanced, Zoom-based learning that we are seeing today. There is a clear difference between quality online learning and ERT. Slapping a course online can represent the content and delivery, and even the evaluation of face-to-face teaching, but, as Carol pointed out to me, all the students she spoke to admitted that they felt they had "learned less" in the ERT condition.

Given the variety of hybrid online teaching, ERT, online education, and other forms of mediated instruction, a useful agenda for the Academic SIG might be to look

to some of the factors of effective online teaching as watchwords for membership interaction. For example, in *Learning Online: What Research Tells Us About Whether, When, and How*, Barbara Means, Marianne Bakia, and Robert Murphy provide a useful nomenclature for that interaction, including online modality (blended, hybrid), course pacing, student/instructor ratios, pedagogy, assessment, instructor/student roles, synchrony, and feedback modalities.

## A SIG on the Move

The history of academics in STC has, as many of us know, often been one of contention and worn out debates about the role of practice versus theory. Luckily, those days are fond memories. A glance at the changing nature of the academic workplace, the way academics communicate, and changes in teaching modalities—just to cover three broad areas—shows us directions in which the Academic SIG can forge ahead. As a facilitator at the helm, Carol Luttrell brings a steady hand and an amazing energy to the work. Academics, who see their reality gravitating toward that of their industry colleagues, can easily see how her leadership can send a message to its members: "This is a SIG on the move." i

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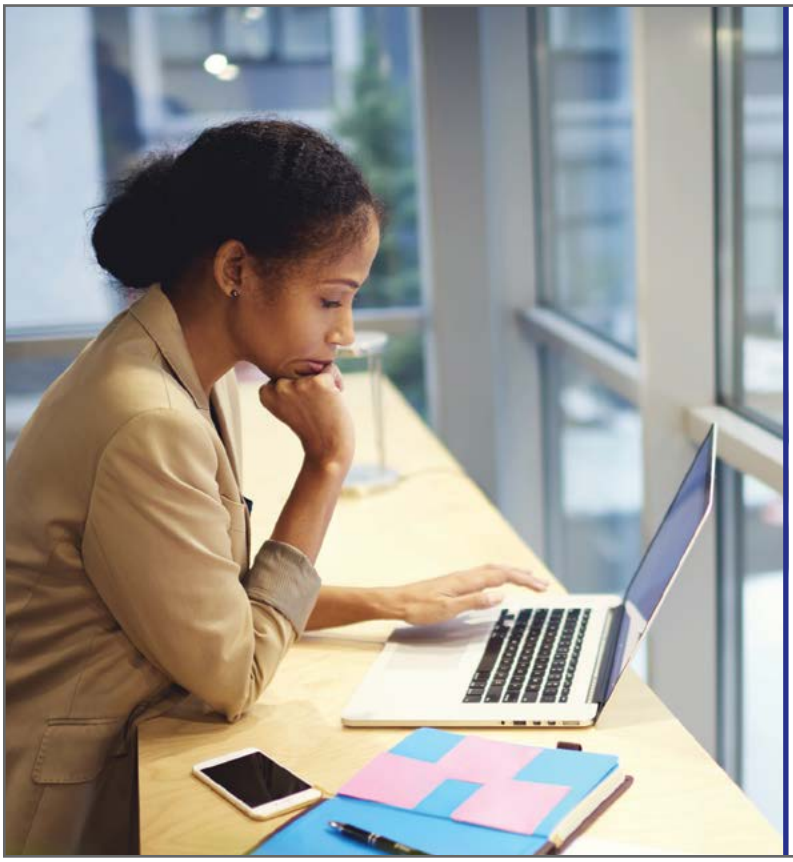

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# SEO for Editors

**BY MICHELLE CORBIN**

*SEO* STANDS FOR "search engine optimization." With so much of the technical content that we produce published online, technical communicators have to know a bit about SEO. To learn the details of SEO, check out *Search Engine Land* and their "Essential Guide to SEO." Another popular SEO learning resource is the *Moz* blog.

In this column, I present a way of thinking about SEO using SEO checklists that we have crafted based on the information in those resources. I might not present it using their terminology (jargon!), but I think they capture the essence of SEO guidelines for technical writers and technical editors.

## Keywords

If you've heard anything about SEO, you've likely heard quite a bit about keywords. *Keywords* are the words and phrases that define what your content is about and that (hopefully) map to what people are searching for. Keywords are the answers to the users' questions, so like all other things in our field, good keywords require knowing your users.

Once you've identified the keywords, you need to use them in all the right places:

- Titles
- Headings
- URLs
- Alt text for images
- Liberally—and especially—within the first paragraphs on a page

Always front-load these elements with your keywords. That being said, make sure you keep your users in mind, and just write good content that your users will want to read.

## Focus on the Content

For SEO, content truly is king. Content must be accurate (updated regularly), complete, and well-written.

It also needs to be compelling. Your content should provide unique information about the subject, answer the question that your users are asking, and be linked to from other pieces of content on and off your site.

The abstracts or blurbs (or snippets or meta descriptions) should also be carefully crafted to include keywords and answer your users' questions. These blurbs are being pulled into search engine results pages (SERPs) to help users decide which link to take.

Headings help users navigate the page and understand the structure of the content on the page. Use lists and multiple, shorter paragraphs to break up large, long blocks of text. Finally, embed multimedia—images and video—to truly differentiate your content.

## Watch the Length of Things

Every title, subtitle, and heading in a piece of content must pack a significant punch for the SEO or findability of your content. Titles, subtitles, and headings will likely be used in SERPs and social media posts, which means that if they're too long, they'll be truncated. Titles and headings should be fewer than 50 characters, including spaces. Abstracts or blurbs should be fewer than 155 characters, including spaces.

## Conclusion

Successful, useful information is easy to find. Findable information uses a core set of content SEO factors. All of the other factors that your site architect focuses on to improve SEO will be for naught if the content itself isn't of the utmost quality.

In Editing Matters, Michelle Corbin covers matters (topics) about editing that matter (are of consequence) to communicators of all kinds. Watch this space to understand more about editing and what you can do to improve the quality of your content. To suggest a topic or ask a question, contact Michelle at *michelle.l.corbin@gmail.com*.

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# Imagining Just Futures by Designing U.S. Technical Communication Pedagogies That Integrate Knowledge from Ghana, Africa

**BY ERIC KORANKYE**

AS AN ACADEMIC from an underrepresented Ghanaian background, I think about how most pedagogies in the field of technical communication are U.S.-centric (based on U.S. culture and concepts) with little or no room for cultural diversity and integration of international knowledge. Instructional materials, textbooks, research modules, dominant discourse, scholarly sources, and recommended scholarship from the U.S. are centered, while canons and frameworks from non-American backgrounds are marginalized. Thinking about how current cultural contexts have affected the way we conceptualize and engage the intersections of language, access, and power in the teaching of technical communication, it is quite evident how exclusive U.S.-centric education is inadequate to respond to the growing demands of technical communication.

The work of technical communicators serves multicultural audiences—users and the public from diverse cultural backgrounds whose perspectives matter in technical communication decisions; therefore, studies in the field should incorporate cultural diversity. Social justice education emphasizes how institutions can better serve traditionally marginalized students and push back against structures that replicate the systems of injustice, unequal access to education, and one-size-fits-all educational practices in many institutions.

In my contribution to amplifying marginalized voices and showcasing the academic scholarship from my background, I seek to explore the possibilities of *just* futures for teaching technical communication in the United States: designing pedagogies that integrate intercultural and international knowledge from Ghana, Africa. The discourse of technical communication and rhetoric in Ghana is replete with experienced researchers, writers, scholars, and curriculum designers whose works have historical and transcendent relevance in international discourse in technical communication. Why is such knowledge, as well as knowledge from other non-American backgrounds, not privileged?

A Ghanaian rhetoric that succinctly describes the work of technical communication is the role of the linguist in the palace of the Ashantis, an ethnic group in Ghana. Culturally, the Ashanti chief or king does not speak directly to his audience (that is, his subjects or visitors); he speaks through the linguist, who interprets the chief's message—which is often couched in highly dense proverbial and parabolic language—to ensure the understanding of everyone. The subjects also pass their message through the linguist to the chief. Usually, the linguist refines the language to make sure it is culturally appropriate, rich, reverential, and not contemptuous. The linguists are not only mediators or interpreters; their active listening skills, understanding of the full context of the communicative situation, fluency of language, and vast cultural knowledge make them cocreators of the discourse in the palace. This role is similar to the work of the technical communicator, who provides clear, simple documentation to explain a company's products or services to end users. If technical communication education could incorporate experiential knowledge such as this from marginalized backgrounds, the field would expand.

Another prominent communicative art in Ghanaian rhetoric is the use of Adinkra symbols—the marks on the traditional cloth of the Ashantis. The various signs and symbols of the Adinkra express African philosophy and wisdom. This indigenous communication medium conveys messages whose meanings can be decoded by people who have Adinkra literacy. Before the introduction of Western systems of writing, these symbols were created by people of Akan ethnicity to preserve cultural values, beliefs, and experiential knowledge. Some examples of these Adinkra symbols are illustrated in Figures 1, 2, and 3.

The Student Perspectives column provides insights, experiences, research, and more from students across technical communication. We're proud to introduce new voices, inject new ideas, and give the practitioners of tomorrow a platform to begin publishing their thought leadership today! Column editor Ryan Weber teaches technical communication at the University of Alabama in Huntsville and hosts the podcast 10-Minute Tech Comm. Contact him at *rw0019@uah.edu* to submit or pitch a column idea.

*Figure 1. This sign, called Akoma, means "the heart." It signifies endurance and love. (Image credit: www.historyplex.com)*

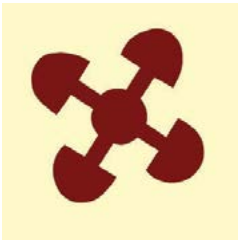

*Figure 2. This sign, called Akoma Ntoso, means "linked hearts." It is used to signify an understanding or an agreement. (Image credit: www.historyplex.com)*

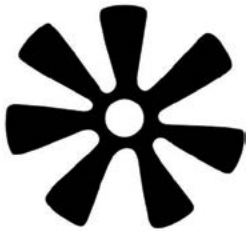

*Figure 3. Ananse Ntontan (a-NAN-Si N-ton-TAN) literally means "spider's web." It's a symbol of wisdom, creativity, and the complexities of life. Wisdom relates to experience, knowledge, and good judgment in decision making and action taking. Creativity includes using imagination and original ideas in artistic work or creating something new and different. (Image credit: www.africanheritagecollection.com)*

These symbols are comparable to the use of signs by political groups, advocacy groups, and religious bodies that carry evocative messages. The work of technical communicators is embedded in rhetoric and culture. Therefore, the integration of these communicative arts into the teaching of technical communication would widen students' perspectives about the importance of signs and symbols and their cultural impact in communication.

Embracing language and cultural diversity in the classroom is one strategy that educators need to consciously adopt to turn such diversity into a valuable pedagogical resource for their teaching and learning. Global studies continue to diversify "learning spaces due to rapidly shifting student demographics and increased efforts to internationalize curriculum to ready graduates for increasingly diverse work environments and the evolving global economy," according to Punita Lumb and colleagues. Often, however, programs in technical communication or educational institutions lack this awareness of diversity, and this affects the academic identities of students from underrepresented backgrounds who pursue American education. As Godwin Y. Agboka, Han Yu, and Gerald Savage have found, "Indeed, language, access, and power are at the heart of our ever-expanding, increasingly globalized work which includes working against injustice through intercultural and international knowledges."

We have the responsibility to address inclusivity in and out of the classroom. We need to be intentional about implementing cultural mediation pedagogy in our technical communication classrooms. This pedagogy will have a ripple effect on our education system and society as a whole and will challenge educational and social injustices. The rhetoric, literature, and scholarship from backgrounds of students traditionally underrepresented and underserved should be incorporated in syllabus design. This approach will help decolonize the classroom and ensure global citizenship and equity education for student success.

In Ghanaian rhetoric, a concept that illustrates the communal strength and unison that I seek to incorporate into this discussion is the Akan proverb, *"Praye, se woyi baako a ebu, wokabom a emmu."* To wit, "The broom is sturdy and unbreakable, because its strands are tightly bound." Literally, when you remove one strand of a broom, it breaks easily, but when you put strands together in a bunch, they do not break. Essentially, I mean to say, "In unity lies strength." When technical communication embraces communal knowledge sharing from different national cultures, we build a stronger community of technical writers, teachers, students, and practitioners.

ERIC KO-RANKYE *(enkora1@ilstu.edu) is a master's student in technical writing and rhetoric at Illinois State University. He is an online teacher of English, a rhetor, an editor, a proofreader, a writer, and a poet. His research interests include rhetoric in technical communication, translingual and multimodal pedagogies, and language and cultural inclusivity in higher education. He is a Sub-Editor in the Parliamentary Service of Ghana and the Executive Editor of West African Magazine in Ghana.*

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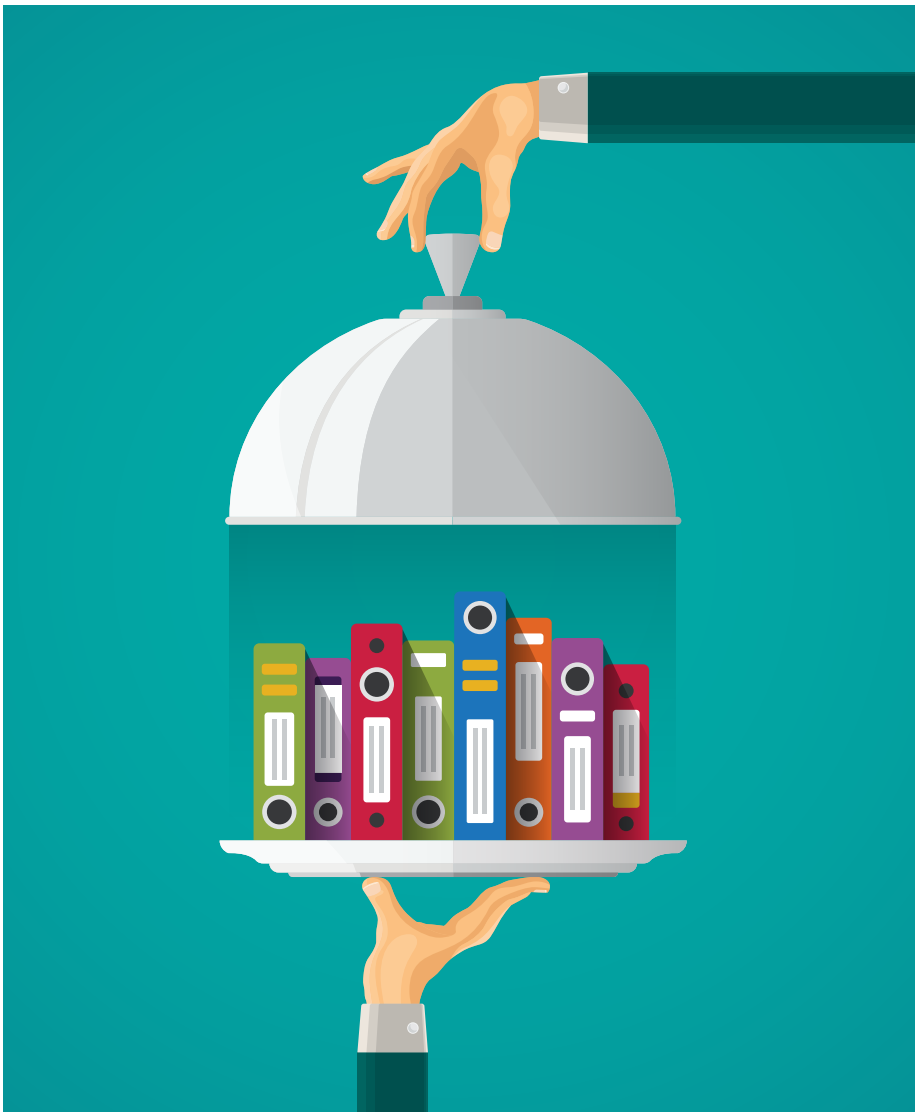
# Content-as-a-Service for Knowledge Management, Powered by Content Intelligence

**BY CRUCE SAUNDERS**

ALTHOUGH KNOWLEDGE MANAGEMENT (KM) as a chartered enterprise practice has been around for 40+ years, its biggest value will be realized in the years ahead. The combined impact of engineering content sets, graph technology, and Content-as-a-Service architectures will change enterprise knowledge as we know it. The effectiveness of knowledge will remain impaired until operating models and methodology move beyond the traditional, siloed content workflows.

Today's world of rapidly multiplying content assets, along with new channels for publishing, calls for new ways of thinking and working. The future of knowledge is contextual. Knowledge no longer works for consumers in document form; it's moving toward modular forms and connected to a customer's unique circumstances and contexts. Thus, the future is dependent on enriching critical knowledge assets into structured, semantic forms, then connecting those assets to Content-as-a-Service and artificial intelligence (AI).



Every day at [A], we see the shifts toward content intelligence inspiring major transformation efforts. Most organizations are moving toward new models for managing their owned spheres of knowledge. The changes in enterprise knowledge and content management are here and accelerating.

## Knowledge Expresses an Organization's *Reason for Being*

The KM function focuses on the "what" and "how" of a company's products and services. Enterprise knowledge investments focus on an organization's "reason for being"—the organization's products, services, and value-add to the marketplace.

Publishers face many challenges creating a new operating model and orchestration approach for dynamic omnichannel content. This column addresses the changing content ecosystem and the evolving dynamics in the space. Questions, suggestions, or feedback? Email *editorial@simplea.com*.

As a result, many company functions integrate with KM systems, including customer support, training, onboarding, documentation, and self-service. Depending on the organization, KM systems might intersect far beyond the traditional areas into marketing, public relations, strategy, market research, and thought leadership functions.

Ultimately, a KM System (KMS) is any type of information technology (IT) system that stores and retrieves knowledge in order to improve understanding, collaboration, and process alignment. Most traditional KMSs are the primary system that a call-center or service-center representative will use to interact with end-user customers.

Within a customer service team, for example, a KM solution provides specific benefits to different stakeholders.

- *Service Agent:* To find information via a single source, provide guided chats for easy and consistent service, and work with built-in e-learning
- *Editor:* To craft custom workflows, create custom-built approval processes, create guided scripts and chats, address complex topics with the ease of a Powerpoint flowchart
- *Manager:* To ensure consistent service from all agents, centrally manage scripts and guides, onboard new agents faster, and generate custom reports

Due to legacy technology limitations, however, many traditional KM solutions have been focused on centralized content and data objects stored in relational databases. Getting at the knowledge requires more-or-less regular, Boolean searching patterns and linear lists of results. Calls to retrieve the identified objects often happen at the document level, rendering many KM efforts little more than large-scale document management systems. As a result, even in the face of large KM investments, knowledge has remained both siloed and difficult to retrieve. This *status quo* demands change, and it is, in fact, now changing and evolving actively every day.

## The Modular Future for Knowledge Expressed in Content

Compared to the evolving omnichannel and content technology landscape, the document-oriented and schema-siloed approach to KM provides decreasing utility. Instead of finding more and more value from capital allocations into KM, with no changes, organizations will continue to find less and less value in those investments.

At [A], we see KM with the development of modular, intelligent, shared content assets. These assets can then—through content-as-a-service—empower diverse internal and external learning and experiences. The modular content being pursued by marketing and customer experience teams is very much related to the modular knowledge assets being called upon by customer support teams. KM can, and should, be a key driver in the gradual enterprise movement toward content intelligence. KM is closely related to Content Services.

If KM is the collection of systems, tools, technology, and processes associated with managing an organization's knowledge, a Content Services Organization is the collection of systems, tools, technology, and processes associated with managing an organization's modular content assets. This may seem like doublespeak, but the distinction between knowledge and content is significant.

> Knowledge precedes content. It is the raw material of content.
>
> Content expresses knowledge. Content is derived from knowledge.

Therefore, when we cultivate knowledge assets, we ultimately give rise to smooth customer and employee experiences and improve the entire value-stream supporting customers and employees.

## Trends Driving Content-Intelligence Transformation

The shift has already happened: The migration away from single-silo, KM applications is a foregone conclusion. Now organizations are rapidly progressing toward an AI-supported and extended organizational "knowledge sphere." Shifting knowledge capital into structured, semantically rich forms—and connecting those assets to machine learning and other AI enhancements—is the path of the future.

At [A], we note the following three trends that should inform any progress on KM strategy in the near future:

- *The rise of Intelligent Content:* Enterprises are moving to component-based content for both KM systems and customer experience (CX), to fuel the assembled, contextual use of content.
- *The rise of Semantic Services:* Enterprises are adopting more modular and graph-based semantics that can be made available in service-provider relationships to multiple systems and applications across teams and platforms.
- *The rise of Content-as-a-Service (CaaS):* Enterprises are moving away from a siloed publishing model and toward the ability to deliver modular content assets via API to many downstream users and applications.

Content intelligence continues to grow across enterprises as new approaches to content get introduced, demonstrate value, and continue to expand adoption.

## Content Intelligence Will Power Artificial Intelligence

Against the content intelligence backdrop, consider the adoption of artificial intelligence (AI), and the ways it is being employed to extend and amplify human knowledge.

Given the vast stores of information, it's natural to seek automation. Vendors promise that content can be automatically indexed and combined across disparate platforms through natural language processing (NLP), entity recognition, and even created into new forms with natural language generation (NLG).

Any AI service that works against unstructured content, however, runs into significant error rates. Machines have a hard time disambiguating complex human communication. As any IBM Watson customer can attest, training machine models on unstructured content is a hugely human-capital-intensive endeavor with highly imperfect results.

The path to coherent AI lies through *structure* and *semantics*. Transforming content sets into structured, semantically coherent services has been sidelined as "too much work" for years, but that is changing in the face of AI consumers. *It's becoming clear that structuring content first takes no more actual effort than trying to train an AI on an unstructured corpus of content and achieves much better accuracy.* One method, structuring, looks difficult at the beginning. The other method, training, looks impossible in retrospect. But the good news is that the mistakes have been made (to the tune of many billions of dollars). We can stop making the same mistakes now. Trying to train recurrent neural networks (RNNs) on unstructured content sets to generate reasonable human responses is ultimately a waste of time. The path to AI is the path of structure. Regardless of the approach, content takes hard work. Never underestimate knowledge. Never underestimate content.

Major barriers to the discovery and usage of organizational knowledge is eliminated when these same technologies are used against structured content sets with human supervision to tag and organize information using a growing semantic model, automatically associating contextual semantic metadata.

Eventually, AI will come to play a pivotal role in constructing and comprehending the insights within rich, ontologically-sound knowledge graphs that power everything. Knowledge management will get amplified in effectiveness by machine-assisted learning, accelerating enterprise knowledge value, and availability to human and machine consumers.

The long-held ambition of proactively delivering "the right information at the right time" to knowledge workers is well underway. As content intelligence and artificial intelligence combine, new world systems emerge that flow intelligence through networks of people and processes to uncover insights and solve problems in real-time.

## Architecting for flow with Content-as-a-Service

All the different systems that content and knowledge has to move through currently require manual transport, transposition, and transformation. As systems and channels increase, the more effort and cost gets involved. All of this friction has been driving Content-as-a-Service initiatives across the enterprise. Sometimes this starts as interest in a headless content management system. Headless content implementations, and larger CaaS programs, in turn, have become a key driver in the evolution of shared team awareness around the needs to architect teams, systems, and processes in new ways.

The goal for everyone: Service-oriented exposure of content and knowledge assets to support an increasing, and perhaps an infinite, number of customer needs and channels across many enterprise systems and teams.

## New disciplines support new realities

At [A], experience leads us to strongly believe that the creation of new practices around knowledge itself is what will make this new era of knowledge asset reuse plausible. The disciplines of structured content and engineering of content—combined with the development of standard, shared semantics around content and the building of new operating approaches—underpin an organization's ability to embrace the new world with intelligence.

Information 4.0 as an analog to Industry 4.0 just makes sense. But these shifts cannot happen within companies with the archaic approach many enterprises still take to authoring and managing content and knowledge.

The future of CaaS and the optimization of KM requires new team roles and organizational structures. [A] advises the creation of a cross-functional *Content Services Organization (CSO)*, incorporating three essential practices: Content Strategy, Content Engineering, and Content Operations. A *Technical Communication* article titled "*The Enterprise Content Services Organization*" provides more detail about the CSO, as does a whitepaper published on **simplea.com**. Suffice it to say, the knowledge management revolution depends on people and processes, organizational design and system design. New approaches and new architectures are necessary for capturing and managing structured related content sets across groups.

## Key Ingredients for Success

The inevitability of change is certain, that much we have been

taught by a year of drastic change in 2020. Knowledge makes things better – not just the existence of knowledge, but its availability, curation, and application in the right moments that matter.

The availability of collected, semantically ready content into systems via Content-as-a-Service endpoints is the inevitable destination for any organization seeking dynamic interoperability.

Knowledge Management is not just a class of software or a single department, but an enterprise-wide *effect* built from multiple causes, most of which deal with the shape, structure, semantics, and annotation of the content itself, as well as the operating model by which knowledge and content are managed every day. The instructions for transformation initiatives should come with the label, "Some restructuring required."

Knowledge Management goals should be extended to include the long-term intelligence of content assets, building content and semantic models, orchestration and governance, content supply chain, and architectural innovation beyond short-term expediency.

Do not rely on any single integrator or a vendor-led implementation. The real solution is far more complex and ecological. Interdependent challenges can only be addressed with a systems mindset that prioritizes the intelligence of the knowledge and content assets over the expediency of their delivery.

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# My Artistic Muse

**BY LIZ POHLAND | STC CHIEF EXECUTIVE OFFICER**

I HAVE ALWAYS enjoyed art as a pastime—both appreciating others' by going to museums and shows and by practicing some techniques myself. Over the years, I have tried colored pencils, pastels, pen and ink, acrylic, and watercolor. Creating art is relaxing and allows my mind to focus on something other than work a few hours a week. At least it did before COVID-19.

For several years now, I have been taking watercolor classes at The Art League in Alexandria, Virginia (https://www.theartleague.org/). When the pandemic hit the United States in early 2020, I was enrolled in a watercolor class on travel-book sketching in plein air. The course was canceled, and I was terribly disappointed. Luckily, later this year, The Art League decided to offer online courses, and I immediately jumped at the chance to enroll again. What I discovered from March to September was that without a class to take, and the interaction with classmates and an instructor, I didn't feel as creative. I needed the structure of class to set the required time aside to focus. And it has been a great joy ever since. I have been the most prolific in my life, and I crave sitting down each week to practice new techniques and to improve my skills. I also have a couple of family members who watercolor, and we hold Zoom calls to paint together and show our work to one another for critiques.

I'm sure many STC members can relate to the pressure of the workplace, especially when many of us are now working from home or working longer and harder than before. Having an outlet for other kinds of activities keeps me happy and creative. Watercolor is my artistic muse: It is not an easy medium, but it is hypnotic and addictive for me; it is the unique spontaneity of the medium that I find inspiring and challenging. Every watercolor artist has an authentic expression of its own, and I hope that by sharing a few of my works here, I can inspire others to share their talents.

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